IMPERIAL

DEPARTMENT OF AGRICULTURE

FOR THE WEST INDIES.

IMPERIAL MYCOLOGICAL
1 JAN. 1931
INSTITUTE

REPORT

ON THE

AGRICULTURAL DEPARTMENT,

ST. LUCIA,

1929.

ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE FOR THE WEST INDIES.

[Price Sixpence.]

PRINTED BY THE GOVERNMENT PRINTER AT THE GOVERNMENT PRINTING OFFICE, CASTRIES, ST. LUCIA.

1930.

FORWARDING DISEASED SPECIMENS FOR EXAMINATION.

PLANTS.

A few fragments of a diseased plant are of practically no value for scientific investigation.

Sufficient material should always be sent so that the primary cause of the trouble may be located.

Full particulars should be given as to the nature of the damage done, the part of the plant attacked, the nature of the soil, drainage, the prevalence of disease, when it was first noticed, and whether any similar kind of disease has been previously observed in the neighbourhood.

Specimens of portions of plants attacked by fungi may be sent green packed in a well-ventilated box if the time taken for delivery is under 24 hours, but if delivery takes a longer time all leaves or soft fruits should be placed in a bottle or corked tube containing a solution made of 1 part of rum or methylated spirit and two parts water. As many stages of the disease as possible should be sent, with notes as to the nature of each stage.

All specimens should be accompanied with detailed particulars of the nature of the disease and should be addressed to:—

THE AGRICULTURAL SUPERINTENDENT,
BOTANIC GARDENS,
CASTRIES.

INSECTS.

Observations and specimens of economic importance or otherwise will always be gladly received.

The following directions should be observed in this respect:—

Living insects should be packed with a supply of the plant on which they are found feeding and the box should have small holes pierced for the purpose of ventilation. This should be carefully packed in such a way as to prevent their becoming crushed in transit.

If it is desired to preserve specimens they should be put in bottles with tightly fitted corks, methylated spirits, diluted rum, etc., making excellent preserving fluids.

Scale insects, etc., should be forwarded on the portion of the plant on which they are found.

If in doubt as to the best method of forwarding specimens, a letter should be sent asking for instructions and stating full details.

In all cases full particulars should be forwarded as to the nature and extent of damage done along with any other important points that may have been noticed.

All specimens should be addressed to:—

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LETTER OF TRANSMITTAL.

TRINIDAD,

C.A. 649. 24TH SEPTEMBER, 1930.

Sir,

I have the honour to transmit herewith the report of the Agricultural Superintendent on the working of the Agricultural Department, St. Lucia, for the year ended December 31st, 1929.

2. The report records a year of agricultural activity and progress in St. Lucia. The work of maintaining the Botanic Gardens was carried on, considerable progress in the development of the Experiment Station at Union was made and the foundations of a successful fruit trade greatly strengthened.

3. During the year there has been an increase in the amount of planting material distributed. Some 55,000 coffee plants and 20,000 lime plants, more than in 1928, account for most of the increase, but there has been a larger number of grapefruit, orange, avocado and pineapple plants sent out than in any recent year. The number of vegetable seedlings sent out also has been much larger than in recent years.

4. The work that has been done in the grafting of avocados, in the budding and grafting of citrus, in the top-working of mango trees, and the development of a method of rapid propagation of pineapple plants is worthy of note.

5. The increase in the propagation of planting material on estates is encouraging. For many years planters have been content to leave nursery work very largely to the Agricultural Department.

6. The orchards and demonstration plot at Union will be of great value in aiding the development of the fruit trade and in providing concrete examples of correct cultural methods.

7. The further development of fruit trade will depend on the quality of fruit exported, the care with which it is packed and the standardization of the package, both as to the quality and appearance. It would appear that the time has come not only to require all fruit shipped to be passed by a Government Inspector, but for all fruit to to shipped by a single shipper, and for this the Government Packing Shed is a necessity.

8. A useful review is given of the valuable report by Mr. H. H. Croucher, B.Sc., Lecturer in Chemistry, at the Imperial College of Tropical Agriculture, on an examination of certain soils of St. Lucia.

9. Agricultural Production has been well maintained in St. Lucia during the year. The yields of sugar, limes and coconuts were greater than in the preceding year; the yield of cacao was somewhat less than that for the previous year. Prices were low for all these products except for limes and lime products and the value of total exports for the year was somewhat less than in 1928.

10. The re-arrangement of the work of the Agricultural Staff has largely relieved the Agricultural Instructor of routine duties at the Botanic Gardens and at Union Station, and this officer devotes his time to country visits and schools examination. The reports on the Agricultural Instruction on the schools indicates that, on the whole, improvement is being made. Suggestions are made for further improvement in connection with the work of the Agricultural Instructor; 10,456 economic plants were distributed to peasants and small holders during the year.

I have, &c.,

H. A. BALLOU,

Commissioner of Agriculture.

Imperial College of Tropical Agriculture.

His Honour
The Administrator,
St. Lucia.

STAFF OF THE AGRICULTURAL DEPARTMENT, ST. LUCIA.

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SAINT LUCIA.

Report of the Agricultural Department for the year ended December 31, 1929.

WORK IN THE BOTANIC GARDENS, AND OBSERVATIONS ON PLANTS.

The seasonal variation of rainfall and general weather conditions was strongly marked during the year 1929 and a partial drought occurred during the dry season February to May, followed by a severe wet season from September to November. In consequence the low-lying area in which the Botanic Gardens stand was badly flooded and leached, thereby suffering much loss of organic matter. This has now been replaced to some extent by loads of decomposed bay leaf mould. It was also necessary to attend to the drainage, and new and larger drains have been prepared to replace the old ones which have gradually sunk below working level. Constant attention to the lawns was necessary, and one flooded area has been drained and raised for replanting Java grass. The lily pond which has for some time proved unsuitable and inattractive was removed and the area was levelled and converted into an arbour. The use of soft herbaceous plants for ornamental work has been discontinued owing to crab pests, and the hard wooded ornamental plants such as Crotons, Hibiscus and Bougainvillea have been used in re-establishing the ornamental beds.

A selection of named standard roses was introduced and planted in the central round bed, and climbers such as "Dorothy Perkins", "Los-Angeles", "Excelsa" etc., have been put out along the roadside.

Specimens of Glyricidia, Eucalyptus, Teak and Lignum Vitae were planted in the Gardens. A number of well grown Croton plants were established in containers for decorative use on the Canadian National Steamships.

A selection of flowering and foliage plants was planted out in Columbus Square, Castries.

Further repairs were made in the Nursery; a large shed, transferred from Reunion, was re-erected for use as a packing shed and tool house. A small extension was added to the office to provide for the increased staff work.

A much larger demand for ornamental plants was dealt with, and a continuous supply of vegetable plants was propagated and distributed mainly to the small planters, as part of the Agricultural extension work.

It is hoped that the Botanic Gardens will be put into more attractive condition in order to appeal especially to the visitors from Canada and the United States. Reclamation and better maintenance cannot be undertaken however, without funds; the most that can be afforded at present is to keep the Gardens clean and to endeavour to repair the lawns and roads.

PLANT AND SEED INTRODUCTION.

The undermentioned seeds and plants were presented to the Department and are gratefully acknowledged:—

Papaws, San Domingo and Martinique; Florida Pecans; Haiti and Martinique Avocados, and Pepper from the Leeward Islands, from Dr. T. Barbour, Allison V. Armour Yacht "Utowana"; *Carotalaria usaramoensis* and *C. sericea*, from Professor S. F. Ashby, Mycologist, Imperial Bureau of Mycology; Sugar cane cuttings, P. O. J. 2714, 2727 and 2725, also a collection of various ornamental and economic plants including *Acasia longifolia*, *Aleurites mollucana*, *Crotalaria maxillaris*, *C. intermedia*, *C. incana*, *C. retusa*, *Gliricidia sepium*, *Ipomea reptans*, *Pistacia atlantica*, and a collection of Sweet Potatoes and Yams from the United States Department of Agriculture, Washington; *Derris elliptica*, from the Department of Agriculture, Trinidad; *Agave sisalana*, from the Department of Agriculture, Antigua; Selected papaws and Gottfreid Avocados, from the United States Department of Agriculture, Florida; and Papaw seeds from Professor Clark-Powell, South Africa.

In addition, the following plants and seeds were purchased:—

Washington Navel, Valencia, Lue Gim Gong and Ruby oranges, Dickenson and Fuerte Avocados, from the Department of Agriculture, Porto Rico; and a collection of Roses and Vegetable seeds from Nurserymen.

Plants and seeds were distributed free to Medical Institutions.

PLANT PROPAGATION AND PLANT DISTRIBUTION.

The year 1929 represents the first full year of the reoccupation of Union Estate. The conditions there have amply fulfilled expectation and have justified the re-development of the Station. Progress has been rapid and in addition to the continued maintenance of orchards and plots of the main crops, new areas have been taken over during the year for extension work and experiment. With regard to plant propagation it may be said that the majority of the St. Lucia planters are becoming definitely "orchard-minded", and orders for fruit plants are constantly greater than the available supply. Progress in plant propagation has however been very successful, and the plant supply has only been limited by the funds available and the necessity of importing new supplies of nursery material. Several new or improved methods of propagation have been introduced and have resulted in rapid increase of plants available for distribution. These methods are briefly described for the benefit of growers who wish to try them.

The following schedule gives an account of plants and seeds distributed during the year 1929 from the Stations and forms an interesting record as compared below with the total plant distribution for 1928, which was the period of transfer from Reunion to Union, and 1927 which was the final year of occupation of Reunion Station.

It will be observed that grafted limes, grafted avocados, and *Coffea arabica*, appear as new and important features in the plant supply service and that the distribution of other valuable plants has been well maintained or advanced.

Plants, Seeds and Cuttings, Distributed during the three years 1927, 1928, and 1929 from all Stations.

	1929.		1928.	1927.
	Castries Station.	Union Station.	Both Stations.	Both Stations.
Lime seedlings	—	19,661	3,870	10,385
Budded and grafted Limes ...	21	291	64	2
Budded Oranges	7	299	251	201
Budded Grapefruit	—	235	30	—
Grafted Mangoes	48	90	118	154
Grafted Avocados	105	151	4	—
Pineapple plants	231	1,022	812	—
Coffee plants	—	55,150	—	150
Coconuts	119	—	46	—
Dwarf Coconuts	—	18	—	—
Claret Nuts	22	—	125	—
Kola plants	—	300	—	—
Grafted Nutmegs	62	—	—	—
Papaw plants	—	1,690	2,015	20
Bay plants	—	—	—	72
Total Orchard plant ...	615	78,907	7,335	10,984
Cane plants	—	72	6,919	6,100
Sisal plants	4,274	—	—	—
Forest plants	120	—	761	507
Miscellaneous plants & cuttings ...	23	59	425	7,161
Total Economic plants ...	5,032	79,038	15,440	24,752
Vegetable seeds (lb.) ...	22	760	114	22
Vegetable seedlings ...	169	2,200	—	300
Total Ornamental plants and cuttings	780	—	389	326
Green dressing seeds (lb.) ...	122	126	—	25
Green dressing plants	—	—	—	125
Fodder plants and grasses (bundles) ...	—	12	—	50
Fodder plants and grasses (clumps) ...	—	—	—	400

NOTES ON PLANT PROPAGATION.

Avocados.

Great success has been obtained in the propagation of the Avocado pear by the splice or cleft graft method. As carried out at Union, this entails the planting and germinating of avocado seed for stocks in a prepared bed in the green house. From the best germinated plants are selected those with single stout shoots about five inches long and these are potted with a suitable forcing compost in bamboo pots. The plants become established in about one week and the head of the shoot is then cut off leaving a watery stock six inches long. With a sharp knife the stock is then cut down through the centre for about one inch. A soft shoot about two inches long of the desired choice variety is now prepared by removing all the expanded leaves, and paring the end down to a thin wedge. This is inserted and pressed well down into the cleft stock. The union is then bound firmly with raffia and the plant watered with a manurial solution and stood aside in the shade. The raffia should be loosened after five days when union will have commenced, and finally removed as the graft swells. After-care consists mainly in removing any stock buds which may develop.

Other successful forms of propagation are the "approach graft", and the "bottle graft" on branches, which is useful for transforming branches of common trees into the desired choice variety whilst still in the field. The grafted branches flower coincident with the parent tree and this permits of the early identification of seasonal forms for rapid propagation.

Limes.

The demand for limes on sour orange stock is steadily increasing and with the new method of propagation in vogue it has become a practicable policy to encourage the planting of the lime on sour stock and to discourage the use of the lime on its own roots. Budding of the lime produced, at first, not more than 30 per cent. successes, and these generally were not well formed trees, due to the lime buds growing out at a right angle to the stock and having to be tied erect. Budding of limes is now more successful, up to 60 per cent. according to season. Grafted trees in large numbers can be produced in a short time by the use of the approach graft method, as in Dominica.

As finally practised in the nurseries, the complete technique involves the sowing of beds of the best sour orange and lime seeds fresh from the fruit. Germination and rapid growth is encouraged, and the beds are inspected and all weaklings are culled out. As the best plants develop a stem fit for handling, the plants are lifted and the roots are puddled. Sour orange plants and lime plants of the same size are then paired off together and planted side by side in the propagation bed, which is then sprinkled with sulphate of ammonia and flooded.

Pruning and disbudding is attended to so as to ensure clean and bare stems, and as soon as the paired stems can be brought together, a strip of bark and cambium one inch long is removed from each opposing surface at about 8 or 9 inches from the ground, and the cut surfaces of lime and sour orange stock are then tied firmly together. The operation is completed by nicking the lime stem below the site of union and by removing the head of the sour orange above the graft. Complete severance of the lime stem can usually be made within eight weeks when the union should be well established, the lime plant showing about ten inches of bare sour stock when finally cleared for lifting. A further development of this method allows suckers to grow on the remaining lime stubs and the resulting branches may be grafted on successive plantings of sour stocks alongside.

The above method readily permits of improved mulching, manuring, and irrigation, and the beds may be kept in good condition and present an orderly array of uniform trees. The grafted lime is a well shaped tree and commences to flower when two years old.

Pineapples.

Owing to the heavy demand for pineapple plants and the scarcity of good material of authentic varieties, the supply of plants available for distribution fell far short of requirements. A new method of propagation was accordingly worked out and has been proved successful in greenhouse culture. The principle is based on the fact that the pineapple plant is a shortened stem system with each leaf axil carrying a bud. If this bud is severed from the parent body and provided with a reserve of food, it rapidly germinates and forms its own root and shoot system. This is accomplished by lifting an adult plant and stripping away all leaves, the exposed stem is then sectioned with a sharp knife into thin discs about one-fifth inch thick and these are dipped in a solution of potassium permanganate. This solution sterilises the surfaces and also induces the formation of a cork cambium, followed by germination. The sections are immediately planted in a prepared nursery bed

and are watered with a solution of a nutrient salt, e.g., sulphate of ammonia. Bud germination takes place within two weeks, usually, from three eyes, and one bud takes the lead. The section is thereupon divided across into three triangular pieces each carrying a bud. These are now replanted in the forcing bed and in a few months will provide plants for field work. Between eighty and ninety plants can thus be obtained from six inches of pineapple stem in three months. In this work it is good practice to prevent the formation of the fruit stalk and so concentrate all growth energy into the formation of stout stems for propagation.

GINGER.

The section method may be applied with equal success to active ginger plants and to similar root and stem structures, provided these are well manured. By the continuous removal of root-bearing buds a supply of the required variety can be obtained within a short time. In all these methods of greenhouse propagation the formation of expanded leaves and flower stems should be delayed until the final division, and a plentiful nutrient supply should be provided by watering with quick acting fertilisers.

PLANT PROPAGATION ON ESTATES.

The propagation of plants on estates has come into practice collaterally with the increased demand for plants, and instruction and demonstration has been given in most districts, whilst on certain estates the managers have been assisted in laying out nursery beds and the formation of small nurseries. This is an effort deserving much encouragement as it teaches the very necessary skill and care required in the formation of present day orchards, and such skill has not been associated with the earlier crops, sugar-cane, cacao, and coconuts; thus the experience gained will be a valuable asset in the fruit orchards of the future. This work also tends to relieve the Agricultural Department from bulk production of stocks such as sour orange and common mango and allows the Department to concentrate on actual budding and grafting and the better establishment of orchard trees. This work has initially dealt with the top-working of common mangoes, and the production of stocks for citrus budding and grafting, and commenced mainly in the Dennery and Soufrière districts where there is large scope for this work. The principal causes of failure in estate propagation are neglect to water the stock plants in pots, infestation by scale insects, deep planting of grafted plants and stocks, and insufficient manuring. Remedial measures are being constantly demonstrated.

NOTES ON PLOTS ESTABLISHED AT THE AGRICULTURAL STATION, UNION.

The following progress notes form a record of the development of the Agricultural Station. Much of the work has been experimental and the notes deserve careful study by planters anxious to benefit from our experience. This applies particularly to those new crops and introduced plants which are now undergoing similar trials throughout the Colony.

CITRUS ORCHARD.

GRAPEFRUIT.

The Florida grapefruit trees "Duncan" and "Marsh Seedless" have on the whole done well. Two plants were lost through a "dieback" associated with inactive root conditions and a cottony root-rot caused by a Sclerotinia fungus. A third plant which was cut back has made a good recovery. Fertilisers such as sulphate of ammonia and kainit have been applied quarterly, and bay leaf mould and green dressings have been used as surface mulch and finally incorporated with the soil.

Scale insect attacks induced by colonies of ants have been remedied by the use of "Agrisol A" five per cent. solution, and finally obviated by the use of grease bands smeared with the proprietary "Ostico". Pruning and the formation of shapely heads has been attended to, and budwood has been removed and used in reproducing over two hundred new trees of these varieties. As a precautionary measure against stem diseases, more of the base of each sour orange stem has been gradually exposed and the soil and mulch is kept cleared from the collar of each tree. The stems have also been treated with Agrisol.

Oranges.

The orange trees have received similar cultural treatment and have made good progress. A severe "bench-root" condition on one Reunion transplanted tree was responsible for continuous attack of the chaffy scale insect (*Parlatoria sp.*) The tree was accordingly destroyed and was replaced by a better one.

Grafted Limes.

These trees were transferred from Reunion in May 1928, and have continued to make good progress. The union with sour stock was made by the bottle graft method and the trees are now two years old. The trees are shapely and vigorous and carried a small crop of the common lime fruit during the year. Wither-tip disease was barely recognisable on the trees during the wettest period and did not affect their general progress.

Hybrid Limes.

The imported hybrid limes have done well with the exception of No. T. 1. which is the nearest approach to the commercial lime. Most trees of this clone are reluctant growers and have had to be re-established on new sour stocks to give better root formation. Consequently these trees have not yet fruited. It seems certain however, that this hybrid though resistant to Wither-tip disease lacks the full complement of lime-oil to make it a successful rival of the common lime, and a back-cross on to the common lime is needed to obtain progeny probably bearing the full lime-oil content.

Other hybrids which have fruited are similar in general characteristics to the male parent, *Citrus aurantifolia*, and are not suitable for the lime industry.

Intercrops.

The manila fibre plant and the Bout Rond banana have been maintained as shelter crops and cut and utilised as mulch. The propagation beds of Sugar loaf, Red Spanish, Smooth Cayenne, Black Antigua and Red Ripley pineapples have been cleared and the plants divided and distributed or replanted.

Coffee Arabica.

The "Blue Mountain" coffee beds were largely drawn upon during the year and over 55,000 vigorous plants were distributed. The seeds gave excellent germination but the seedlings were subsequently attacked by the coffee leaf-miner during the wettest months. This insect, *Leucoptera coffaeella*, is a small and active white moth; its larvae eat the leaf, forming galleries under the epidermis. Infestation was greatest in the late sowing and on plants fully exposed to the sunlight and wind. Shade and shelter appeared to discourage the leaf-miner. A fair control was obtained with fortnightly sprays of Agrisol one per cent. solution, but better results were obtained with the use of *Crotalaria sericea* as shelter belts. Infestation did not affect the plants seriously however and the subsequent transplantings on the estates have remained free from leaf-miner. With the object of investigating the parasitism of the leaf-miner, the matter was taken up with the Commissioner of the Imperial Department of Agriculture, Trinidad, and material has been reserved for an investigation which will be put in hand during the present year.

Green Dressings.

The plots were dressed with various leguminous plants and this considerably reduced the cost of weeding. The tilth of the plots have also been improved through the addition of decaying organic matter. The most satisfactory green manures for this orchard work were *Crotalaria striata*, *C. usaramoensis* and *Tephrosia candida*. A selection of eleven other kinds of green dressings has been grown and seeded in this area and seed collections have been sent out to interested planters. The green dressings available at the Station are as follows:—

Black-eye pea; Horse-bean (*Canavalia ensiformis*); *Calapogonium mucunoides*; *Crotalaria anagyroides*; *C. usaramoensis*; *C. sericea*; *C. striata*; *C. retusa*; *Tephrosia candida*; *Indigofera hirsuta*; *I. sumatrana*; *Stizolobium aterrimum*; Pigeon pea (*Cajanus indicus*); *Phaseolus mungo* and *Dolichos Hosei*.

Cacao Plot.

The cacao crop for the year was reaped mainly during the periods January to May and October to December, and amounted to a cured bean weight of 307 lb. which was sold for £2 4 6. The figures below give the total number of maturing pods carried on the 308 trees recorded throughout the year:—

No. of Trees.	Total pods.	Pods rat eaten.	Pods diseased.	Pods sound.
308	14,847	6,645	2,958	5,244 (=4,930 lb.)
	Per cent. (=100)	44·8	19·9	35·3

The large number (44·8 per cent.) of pods lost through rats and other rodents is exceptional in view of the fact that the plot is immediately adjacent to a frequented public road; it is instructive in showing the heavy losses which must occur unmarked where no system of record and check is in use. Measures are to be devised to curtail this loss. Certain trees in this plot have been found to yield as much as 2 per cent. of the total crop from 308 trees; the latest records indicate that these are natural highly productive trees, and are to be contrasted with a number of trees which consistently bear no crop. Selection of productive strains and of strains suitable for as budding stocks is thus being proceeded with.

Citrus Nursery.

From this area was distributed the first grafted and budded citrus plants, and coffee and papaw plants have also been lifted and distributed during the year. The beds have now been remade and replanted with selected sour orange plants to serve as stocks for budding grapefruit. The main citrus work has enlarged beyond the space available here and other propagation has been transferred to the mango plot.

Orchard Section.

This plot consists of an area of one and a half acres and contains not only the selection of mangoes adopted as standard varieties by the Department, but also a collection of other standard fruit trees which provide the material for plant propagation. These trees are planted out at orchard distances and rotation beds of sour orange and avocado stocks are run between them, the trees themselves stand undisturbed in shelter belts of green deessings which provide shade and mulch.

The "Julie" mango, of which several forms exist, has been adopted as the standard choice mango for market. A late fruiting form is now being prepared to produce fruit out of the regular season and so extend the marketing period of this fruit. The trees have made good progress and are already being used for approach grafting. The following varieties are now established, viz., Julie, Graham, Peach, Matin, Ceylon, and Bombay.

The orange collection introduced mainly from Porto Rico has done well and budwood has been continually supplied for propagation of the newer varieties of oranges, viz., Late Valencia, Parson Brown, Lue Gim Gong, Pineapple, Ruby, and a new Washington Navel. The old trees planted in 1908 have proved undesirable for propagation work on account of the poor types of fruit produced and the diseased conditions of the stock incurred through original low budding.

Avocados.

The collection of avocados contains both local and introduced varieties and these have made good headway since being grafted on the local stocks. The trees have been used for supplying propagation material for indoor and outdoor work, and the collection has been increased by the introduction of the "Gottfreid" avocado from Florida through the courtesy of Dr. Fairchild, Agricultural Explorer of the United States Department of Agriculture, and Dr. T. Barbour who visited the Station during the year. The mainland avocados such as the Guatemalan varieties are thick skinned forms which apparently carry better than the local forms. The thin skinned West Indian varieties are however readily purchased if they reach the market in sound condition. For this reason certain varieties have been carefully selected as standard types known to ship well and representative grafted trees of these are now established and flowering in this plot; from these bud wood is being taken. A late fruiting variety has also been planted and the complete collection is now as follows: - Guatemalan varieties—Dickenson, Nimlioh, and Fuerte; Florida varieties of West Indian type—Gottfreid, Rudder, and Pollock; West Indian varieties,—St. Anne, Martinique variety, St. Lucia G.H., G.O., G.A., and Morne varieties.

A collection of miscellaneous fruit trees has been put out adjoining the avocados and includes a large fruiting variety of seedless Sapodilla, the Mexican cherry, (*Prunus Capuli Car.*,) the white Sapote (*Casimiroa edulis La.*,) and the Mangosteen (*Garcinia mangostana L.*)

The remainder of this section having been cleared from lime trees, has been replanted in approach grafted, bottle-grafted and budded limes of recorded highly productive forms as identified and numbered in the Annual Agricultural Report for 1927.

Papaw. (*Carica Papaya*).

A collection of papaw varieties was planted out for observation on production and fruit characters, and included varieties from Hawaii, San Domingo, South Africa, and China, the United States, Martinique, and the local forms. On comparison the Hawaiian variety is undoubtedly the most prolific and hardy and its flesh is well flavoured and of a melting sweetness. A crop of forty to fifty fruits was carried on most female trees within ten

months and there was less variability in size and shape of fruit in this variety, as compared with other varieties under observation, and it is not subject to stem rot. Trial shipments of this fruit are reported elsewhere and showed that the variety can be shipped to the northern markets if properly packed. For estate cultivation the papaw plots should be double planted at 6 x 6 feet diagonally so that the barren male plants recognisable when about five months old, can be weeded out and the space utilised by the remaining fruit bearing trees. Periodical irrigation and supplies of liquid manure is a desirable practice when growing papaws for export.

Sweet Potatoes.

An investigation on the export market value of selected local sweet potatoes was carried out during the year and is more fully reported under the section on Fruit and Vegetable trials. In view of the market reports that certain varieties were favoured as against the local varieties it was decided to introduce a selection of named varieties such as are well known in the American trade. This was accomplished through the good offices of the United States Department of Agriculture, and the following varieties have been established at Union in the Orchard Sections:—(a) Yellow Jersey and Gold skin; these are the dry-fleshed, mealy varieties of the Jersey type preferred in the northern markets. (b) Nancy Hall, Porto Rico and Southern Queen are moist-fleshed, soft varieties preferred in the Southern States. Rapid propagation of the varieties is being effected in order to distribute planting material for further trials. The varieties, Southern Queen, Porto Rico, and Nancy Hall are interesting in having an erect bunchy growth and could be grown in combination with other crops such as plant canes, vegetables and orchard crops.

Yams.

A collection of yams was grown and reaped in this section and the crop returns are shown by the following actual and calculated weights of the lifted roots—

Kind.	Area.	Planted.	Holes.	Total weight.	Average weight per hole.
Native Lisbon ...	360 sq. ft.	17.5.29.	12	69 lbs.	5·7 lbs.
Horne ...	140 „ „	11.6.29.	16	21 „	1·3 „
Potato ...	962 „ „	17.5.29.	104	225 „	2·1 „
Purple Ceylon ...	144 „ „	11.6.29.	144	25 „	2·0 „

The "Potato" yam is probably the most palatable yam yet introduced, and in view of this and its potato-like tubers which can be served whole whether roasted or otherwise cooked, the variety should become a favourite with the northern markets. The original stock was introduced from Porto Rico, in 1928, and practically all of this material has been distributed for estate planting.

Coconut Plot.

The Malay dwarf coconuts have made good progress and some are now flowering. The plot has been added to by the germination of local seeds obtained from the earliest nuts imported. Other plants have been distributed to meet a growing demand. Dwarf coconuts on estates have done well and plants are being raised from local seed. At present the yellow variety is the most prolific and is carrying upwards of eighty growing nuts simultaneously. In Malay (1) the green dwarf produces 10·8 per cent., and the red dwarf 8·5 per cent. more copra per nut than the yellow dwarf palm, and the yellow variety is regarded as being more susceptible to unfavourable conditions and less situable for making copra owing to its very sweet meat and milk. The dwarf nuts as a whole appear to yield 8 to 12 per cent. less copra per palm than the average tall palms in Malay, but over ninety palms can be planted per acre as against fifty of the common palm. The dwarf green nut should therefore prove a profitable investment. The selection of good seed parents is however most important in all coconut varieties, and this will in the future largely influence the difference between profit and no profit in cultivation under average conditions. By selection alone the first generation of common tall coconuts can be so improved as to yield twenty-five to thirty-five per cent. increment on unselected palms and an increased production of fifty per cent. is not regarded as exceptional. (2).

The three plots of selected varieties of local coconuts, the golden nut, the large green and the claret nut have been extended but no other improved varieties have since been introduced.

Sugar-cane.

All Sugar-cane varieties have been established in the upper half of the Station on alluvial soil and have done well. The area formerly in cane is now being turned over to fodder plants, such as Elephant grass, Guinea grass, Guatemala grass, Uba cane and Co. 224. Inclusive of new introductions being grown apart in the quarantine area the

(1) Malayan Agricultural Journal, Volume XVII. June. 1929.
(2) H. W. Jackson and W. N. Sands, Malayan Agricultural Journal. Volume XV, No. 11. 1927.

following canes are now available at the Station:—P.O.J. 2725, P.O.J. 2878, P.O.J. 2727, P.O.J. 2714, B.67, B.156, B.409, B.417, B.472, B.208, B.381, B.374, B.726, B.6388, B.H. 10 (12), S.C. 12/14 and B.A. 11569. Of the Java sugar canes now obtainable at the Station, P.O.J. 2878 and 2725 have been propagated rapidly and nurseries of the varieties have been formed on the principal sugar estates. P.O.J. 2878 is a strong grower with promise of good ratooning power, it is particularly susceptible to moth borer (*Diatraea saccharalis*) in the plant stage but becomes normally resistant after forming a good stool. P.O.J. 2725 is a very strong grower and shows marked resistance to moth-borer in all stages of growth.

Demonstration Orchards.

An area of six acres of alluvial flats has been cleared from neglected cacao and laid out in one-acre plots in preparation for a demonstration of orchard production and marketing. The plots are being planted in one acre of each principal fruit tree recommended and distributed by the Department, with cash crops to recoup the expenditure of establishing the main crops, and with suitable green manures as nurse crops. The cost of each operation is being carefully recorded and the final marketing of the crops will give most useful information on the net profits derivable from each crop, and will enable improved methods of orchard culture to be worked out and demonstrated. The initial cost of clearing timber and bush was reduced to a very low figure by getting charcoal burners to clear and make charcoal on selected spots. The following plots have been formed—

Grapefruit Plot.

Planted with selected sour orange stocks at 28 feet by 22 feet, for budding Marsh Seedless and Duncan grapefruit; with horse beans as shelter on beds, intercropped, with varieties of sweet potatoes, yams, and ground nuts.

Orange Plot.

Planted with sour orange stocks at 28 feet by 22 feet, for budding with Late Valencia, Lue Gim Gong, and Parson Brown oranges; with horse beans, and intercrop of pineapples.

Avocado Plot.

Planted at 30 feet by 30 feet with four varieties of avocados, grafted on selected local stocks, Fuerte, Nimlioh, G.H. (local) Galvana (local); with horse beans, and intercropped with Hawaiian papaw.

The mango plot will consist of "Julie" and "Peach" varieties, the former being selected for early, main crop and late varieties which are being prepared.

Further plots will contain Jamaica Blue Mountain, *Coffee arabica* and grafted nutmegs. The plots are being provided with windbreaks including Gliricidia, and Liberian coffee. Roads and drains are being laid out and the externals of plots are being utilised by various stocks for propagation and mulches.

This area has, in common with the greater part of the alluvial land at Union, proved very easy to work, the soil being a deep, friable, brown loam, of approximately neutral reaction (p.H. 6.8.—7.0 by the colorimetric method), of moderate humus content and well drained. A stretch of the river bounding this area 300 feet in length was straightened out by diversion to a newly excavated bed 100 feet in length at a cost of £25. This diversion has been entirely successful and removes any danger of flooding, and it has made available a further area of excellent land utilised for Jamaica coffee. Minor diversions which have been made have been equally successful.

Lime Experimental Plots.

An area of six acres lying to the north of the orchard section (p. 3) has been cleared from bush and laid out for planting with sour orange stocks budded or grafted with selected common limes. Four acres have been mapped out for manurial trials on limes including the use of mulches, the experimental layout being conducted with the advisory assistance of the Imperial College of Tropical Agriculture and the Imperial Bureau of Soil Science, Rothamstead.

Two acres have been reserved for trials of limes on sour orange stocks, (a) in the presence of factors believed to encourage; and conversely, (b) to reduce, the incidence of wither-tip disease. Low total nutrients, close planting, heavy shade, and constant high humidity are factors predisposing to wither-tip in the normal St. Lucia lime plantations, and these, and opposing conditions will be induced as far as possible by the lay-out now being proceeded with.

A collection of Pigeon peas was imported from Trinidad, and the following varieties have been successfuly grown and distributed from this area to estates as cover crops:—Arahar, Trinidad selected, and Hawaiian dwarf peas.

NURSERY STRUCTURES AND BUILDINGS.

The greenhouse erected in 1929 has proved indispensable. Its value has been greatly enhanced by the erection of a portable stage and a concrete solar propagation pit with an external insolation frame. Soil temperatures above 100 deg. F. are readily obtained if required on normal sunny days. The pit consists of a bed of sterile sand resting on fibre which in turn is drained by broken stone, drainage escaping by a separate exit so that the insolation frame remains dry and bright. This pit is used in starting pineapple sections and other plant material and is as efficient as the heated frame of the European gardens.

A roofed cattle pen with open railings and drainage pit has been erected for the use of employees' animals and from this, manure is obtained for the plots. In addition a supply of sulphate of ammonia, nitrate of potash and calcium super-phosphate has been stored in the building.

The Foreman's quarters and the Nurserymen's Bothy were given some urgent repairs, but more attention is necessary to convert these structures into comfortable living quarters.

Small lots of woodland have been cleared by employees, and gardens and huts are now being established. Offences of praedial larceny and trespass were practically absent during the year. The Station has become a popular visiting place with planters and the general public, and formal and informal excursions were arranged frequently and conducted by a senior Agricultural Officer.

Future Developments.

The erection of irrigation pump and distribution piping, tanks and hydrants is being arranged. River boundaries are being fixed and windbreaks, roads, hedges and main drains are to receive more attention. A pasture is being made for the grazing of various pedigree stock which it is proposed to import next year.

A number of boys from the Primary Schools, and from St. Mary's College, Castries, have been recruited for probationary training in nursery and field work and are preparing for travelling work as propagators loaned to estates. It is hoped finally to restore the Agricultural pupil system on a practical scale where young men can be trained by the Department and absorbed into the estates for orchard work.

FOREST CONSERVATION.

In the absence of adequate funds it has not been possible to establish any large number of forest trees. A small collection of West Indian (*Swietenia Mahogoni*) has been propagated with other local forest seedlings, and a collection of West Africa forest seeds was propagated for a local estate interested in timber trees. Legislation to control the firing of forest and bush land is being prepared, and educational leaflets on the management of cassava lands have been printed and distributed, and meetings were arranged by the Agricultural Instructor on this subject.

CONTROL OF INSECT PESTS.

No serious pests came under notice during the year, with the exception of the coconut weevil mentioned in the Annual Report 1926 page 10. Further specimens of this insect were obtained for identification and its habits studied. Treatment was given by removing and burning the infected petioles and old branches of coconuts growing by river banks on one estate where this weevil is common.

Cacao Thrips

Observations on this common pest lead to the conclusion that unfavourable soil conditions and exposure to wind will induce an attack of *Thrips* which otherwise would not assume economic importance. Thrips are usually associated with wind blistered foliage, with leaves showing dead and broken margins, attributable to unsuitable soil conditions such as bad drainage and lack of nutrients. Where these conditions can be remedied the use of Gliricidia sticks planted for shelter and mulch is a simple and successful means of assisting the recovery of impoverished trees. Attention is being directed more to the examination of the soil, rather than the temporary expedient of spraying, and an examination of the soil reaction in certain cases has revealed a high lime requirement, a range of p.H.4.5. to p.H 6.8 being obtained by the B.D.H. colorimetic soil test.

CONTROL OF FUNGUS DISEASES.

Limes.

Withertip disease with the subsequent stage of blossom blight and fruit canker was prominent following the wet spell of January and February. A good recovery was made from the early set-back and in spite of generally wet weather the main crop was satisfactory.

This was particularly true of the larger Soufrière estates, where constant mulching and attention to manuring has brought the trees into a vigorous condition as evidenced by the dark green foliage and the strong succession of new growth.

The whole question of wither-tip parasitism is very complex and exact information is much needed on shelter, mulches and soil nutrients. This it is hoped to supply by means of the manurial and disease experimental plots now being established at Union.

Cacao.

Rosellinia root disease and cacao pod-rots continue to harass the planter, and in some areas where the cacoa fields have been broken up, it has been advised to clear away the remainder and replant with sour orange stocks for budding citrus fruits, or with budded citrus direct. In the healthier estates cacao has done well and is responding to manures. Regeneration by promoting the growth of a strong water sucker offers a means of restoring a productive branch system. The reduction of heavy shade by partial pruning has been encouraged on certain wetter estates. The practice of burying empty pods, prunings and mulch with lime in shallow trenches is being tried on some estates where root disease is not prominent. An inspection was made of the cacao land in an area where root disease accompanied by a leaf-margin die-back has persisted for many years, in spite of the isolation trench system. The soil was found to consist of a thin layer of black forest soil overlying a grey substratum of drained swamp mud, each showing a very sharp horizon. The subsoil showed only a brief penetration of rootlets already blackened and dead, the main rooting area being confined to the upper layer of soil. The reaction of the soil was found to be p.H. 4·0 and p.H. 4·5 respectively. An application of lime to correct this acid condition, and the building up of humus in the soil was recommended, in order to bring about a suitable rooting medium for good growth, and a trial plot is being prepared for observation. Pod-rots could be reduced by more careful treatment of the fruit-bearing cushions. Pods should be cut off, and any wounds formed in pruning or excision of canker should be treated with "Agrisol", a proprietary tar distillate which is proving very useful. Agrisol A. has been adopted by the Department for general plant and tree surgery on account of its inducing ther eady formation of callus over cut surfaces, and it is serviceable as a fungicide and insecticidal spray when diluted with water to the appropriate strength. It should become popular among planters.

Coconuts.

The survey of coconuts was continued thoroughout the year by the two Plant Inspectors. Revisits were made to inspected areas and new plantings were examined. In one large area in which coconuts are being substituted for sugar cane, special precautions were advised in order to improve the drainage and soil conditions as a preventive measure against epidemic bud rots. The following statement summarises the survey:—

Number of Coconut Trees examined and Reported on during 1929.

Examined	114,373	Destroyed ...	178
Affected with disease ...	596	Treated ...	175
(diseased per cent. ...	= 0·52)	Under observation ...	243
		Total ...	596

Under the number affected with disease (596) the following percentage has been observed—

Budrots	39·8	Bitten-leaf disease ...	8·6
Little leaf disease ...	39·3	Old age	0·6
Stem bleeding disease ...	12·3	Withering-leaf disease ...	0·2

The use of green dressings particularly the dwarf pigeon peas has been instituted on coconut estates and this practice is bound to have useful and economic results.

Sugar-cane.

An inspection of cane fields was carried out during the year to determine whether

true gumming disease as identified by a gummy extrusion, existed in St. Lucia. The survey had interesting results in revealing causes of cane sickness and failure apart from gumming disease and the chief pathological effects are tabulated below. The presence of gumming disease was evidenced by very marked leaf stripping and leaf splitting in certain fields which for economic reasons had not been kept in good cultivation. No gumming of canes was anywhere found and the subsequent die-back of stools was very largely influenced by lack of manures, no weeding and poor drainage. A condition of "bunchy top" was also found on some ratoon canes where the growing bud had become entangled in the stunted leaf tissues and subsequently decayed. Dead-hearts due to moth borer were also counted. The following incidence of disease is not an exact analysis. It gives the number of stools examined and some indication of the more common varieties affected. The field survey was made by inspecting and counting all stools met with in transverse penetrations through the cane-fields, several such penetrations being made on larger fields.

Number of Cane Stools Examined and Reported on in 1929.

Stools examined	10,507	Gumming disease, Leaf striping ...	771
Stools diseased	842	Bunchy top	20
(per cent.	=8·01)	Dead hearts (Moth borer) ...	51
		Total	842

Cane Varieties.	*Per cent. Diseased.*		
In order of numerical importance.	Leaf Striping per cent.	Bunchy top.	Dead hearts.
B H 10(12)	40·1 (a)	...	...
Local variety	13·6 (b)	...	5·6
B 147	13·4	...	0·5
Ba 6032	1·2	...	...
Black cane	8·4	...	...
Other varieties (including Ba 11569)	13·4	2·4	1·4

The survey took place following the rainy season. This was exceptionally wet and may account for the rapid reappearance of leaf symptoms in most of the cane fields. The local form of gumming disease is definitely responsive to wet soil conditions and the greater proportion of the striped leaves seen during the survey occurred on the more recent growth made after the dry season. Canes tolerant to wet conditions are also tolerant or resistant to Leaf-striping, and show less effect of saturation than do the dry-loving varieties such as B H 10 (12), B 116, Ba 11569 and Sealy seedling.

Professor S. F. Ashby, visited the Colony in March 1929, and made a tour with the Agricultural Superintendent through areas where various important diseases have appeared from time to time. His observations on limes recall that this was the third year of blossoming since Wither-tip invasion, and that the setting of the young crop was very promising. As indicated in the Lime section under "Progress in the Chief Industries" the crop output estimated by the exports was an increase of twenty-four per cent. over the previous year 1928. This increase coming after two unfavourable seasons demonstrates that the limes are acquiring some immunity to Wither-tip and fruit canker, and that losses caused by the blossom-blight stage are largely compensated for by the formation of new fruit spurs.

The Mycologist further remarked the absence of diseases in the imported grapefruit, and the promising development at Union Station. Later in the year Leaf-scab (*Cladosporium citri Lobb.*) was found at Union on some stocks but has since been rogued out.

PLANT QUARANTINE. (Plants Protection Ordinance).

The importation of all plant material was carefully watched during the year and on four occasions illegal consignments were intercepted and destroyed, these consisted of sugar-canes P.O.J. four varieties, two of which were affected with Mosaic disease; corn, grapefruit plants and seed coconuts. All soil imported with permitted plants was washed off and burned. A total of 102 importations were inspected and treated where necessary during the year. The ready co-operation of the Customs Department is a valuable and essential feature of the plant quarantine.

The following plant material is not permitted introduction into this Colony under the Ordinance as it may be the means of introducing diseases or pests:—

(a) in semi-neglected area only.
(b) generally infected but only light leaf marking.

COCONUTS.

(1) Coconuts, coconut plants or any parts thereof from all places, except under licence.

BANANAS.

(2) Banana plants or any parts thereof that may have come directly or indirectly from Trinidad, Tobago, Grenada, Central and South America.

CACAO.

(3) Cacao plants from South America.

CITRUS (ORANGE, GRAPEFRUIT, LIMES, ETC.)

(4) The importation of all plants of the Citrus family is absolutely prohibited except under licence.

(5) Coffee, Mango, Guava, Sapodilla and Star apple plants from the Bahama Islands, Ceylon, Cuba, India, Jamaica and the Philippine Islands except under licence.

COTTON.

(6) Cotton seed and all parts of the cotton plant are prohibited except under licence, and subject to treatment on arrival.

SUGAR-CANE.

(7) All plants of the grass family including Sugar-cane, Sweet Corn, Sorghum are prohibited except under licence.

FRUIT AND VEGETABLES.

8. Under the Customs Amendment Ordinance, Notice No. 3 of 1929 prohibits absolutely the importation of the following articles from the United States of America: soil, earth or compost, with packages or containers, fresh fruit and vegetables, unless inspected and certified by the Department of Agriculture of the place of origin, to be free from the Mediterranean Fruit Fly and grown in a fly-free area, and not to have passed through an affected area, and certified passed for import by the local Agricultural Department.

Exceptions were authorised for shipments made before the publication of the Notice. Under Notice No. 7 of 1929 the importation of any fresh fruit and vegetables from Bermuda except Potatoes (*Solanum tuberosum*) and Onions and Garlic is prohibited.

In order to comply with this notice importers of fresh fruits and vegetables must produce a certificate of origin of the shipment.

Exportation of Plant Material

Exporters of fresh fruit, plants and seeds may obtain information on overseas quarantine and certificates when necessary from the Agricultural Department.

DISEASES AND PESTS WITHIN THE COLONY.

The existence of the following diseases and pests should be notified to the Agricultural Department in order to comply with the requirements of the Plants Protection Ordinance:—

COCONUTS—Budrots of Coconuts;

SUGAR-CANE—Gumming disease of sugar-cane;

BANANAS—Panama disease, Marasmius disease, Banana Weevil and Borer;

COTTON—Pink bollworm of cotton;

the presence of the parasites Love Vine and Bird Vine should also be reported. It is observed that Love Vine or "Dodder" (*Cuscuta americana*) is increasing and appears in cultivated areas. This pest is apt to become a troublesome and expensive one to eradicate, and it should be collected and burned where found near any cultivation.

Cases of Coconut budrots, leaf stripe of Gumming disease of Sugar-cane, and minor parasites were reported and investigated during the year.

ANIMAL QUARANTINE.

FARM PRODUCTS.

Under Ordinance No. 17 the Governor in Council may prohibit the importation of animals or farm products which may be a means of introducing disease; the importation of animals and farm products from the United Kingdom, Isle of Man, and Channel Islands is prohibited; the importation of animals and farm products from Nevis and Grenada was temporarily prohibited on account of Anthrax.

IMPORTATION OF BEES.

Under Ordinance No. 18 the importation of any queen bee or bee-keeping apparatus, if used, is prohibited except under certificate approved by the Agricultural Superintendent, to the effect that Foul Brood has not existed in the apiary or in connection therewith.

FARM STOCK AND POULTRY.

The farm stock of the Department consists only of draught donkeys used for transport, but it is planned to import a selection of pedigree animals in the coming year. Information on new stock has been circulated among planters who have become interested in obtaining better animals for breeding work. Five pedigree young bulls have been recently imported as follows:—Three Holstein or Freisian bulls from Trinidad and Canada; one Guernsey bull from Trinidad and one Shorthorn from Barbados. In several cases the Department undertook the purchase and importation arrangements and will be glad to do so in any further introduction. Information on dietary and milk production has been supplied to those interested.

Mules have been in demand on the cane estates and other estates for draught work and some very good animals have been bred locally. The use of lime mill press cake matured as a silage feed and fed to the working cattle has given very good results on several estates, and this ration should be more widely used where lime products are made. The general effect is to put failing animals in good condition. The silage should not come into contact with the feet of animals as it gradually breaks down the structure of the hoof.

The breeding of poultry continues to be haphazard. This is regrettable when it is remembered that the several lines of steamships require large supplies of eggs which at present take up storage space. The local price for eggs continues to be higher than is necessary, owing to indifferent supply. The culling of poor layers for use as table birds and the isolation of good laying strains, would enable a local supply to be worked up within a short period. An attempt could then be made to provide table birds and eggs for export.

EXAMINATION OF AGRICULTURAL PRODUCTS.

The results of the soil survey carried out by Mr. H. H. Croucher, B.Sc., Lecturer in Chemistry, Imperial College of Tropical Agriculture, with the Agricultural Superintendent, on the principal crop soils during 1928, came to hand during the year and were made available to interested planters in a special publication. As this is the first occasion of a detailed inspection of St. Lucia soil, a short appreciation of this useful work is included below for the benefit of the planting community. The number of samples taken was approximately eighty.

The cultivated soils of St. Lucia fall into three groups:—

(I) the heavy alluvial loams of the main valleys,

(II) the lighter sedentary soils of the South and Southwest;

(III) the sandy, detrital or hill-wash soils.

(i) *The Alluvial Soils.*

The alluvial soils have been formed by silt depositions and are still being added to during floods, the resulting soils are brown loams or clays of varying consistency which may extend to great depths. Most of the soils are in excellent tilth, and have been extremely fertile. This productivity has in some cases been affected by continuous cropping but fairly good crops are still obtained. Such lands are found in the sugar valleys. The alluvium consists of an average of 25 to 40 per cent. sand with rare extremes of less than one per cent. sand in clay soils, to 83 per cent. in sandy areas.

The humus content of the alluvial soils is variable being largely influenced by leaching, the average range is somewhat low, from 0.60 to 1.50 per cent. of humus in the top sections, with an extreme of 10 and even 29 per cent. in certain fertile bog lands.

The available amount of the three most important nutrients, e.g. nitrogen, potash and phosphates suggests that crops on these soils would respond to fertilisers containing potash salts, e.g. Sulphate or Nitrate of Potash, and Phosphates, e.g. such as ground rock phosphate, but field trials are necessary before the use of these fertilisers on a large scale can be recommended. Nitrogen in the form of high grade neutral sulphate of ammonia is often acid and would be detrimental to these soils which are already acid. The mode of cultivation tends to further deplete such basic salts, principally calcium, as are present in the soil. Fairly heavy applications of ground limestone are recommended for these soils, the practical lime requirement in general terms ranging from five to fifteen tons per acre, which it is recommended should be applied in one dressing. Organic manures such as pen manures should be enriched by a sprinkling of sulphate of ammonia and superphosphate, and when acid conditions are obtained in manure-making as revealed by slimy, semi-decomposed manure, the heap should be watered with lime water in order to bring about the neutral condition, favourable to bacterial activity.

Humus is generally needed and the best method of applying this is in well rotted manure. Thrown-out cane land should be fallowed in green manures and every opportunity should be taken to build up the organic matter depleted by leaching.

(ii) *The Southern Sedentary Soils.*

These soils are in general more shallow and are more exposed to drought than the foregoing type. The parent rock is near the surface and contains calcium, therefore the need for lime applications is not so insistent, and neutrality can be maintained by gradual deeper cultivation, and weathering of the subsoil and underlying rock which breaks down and forms a light loam. As indicated these soils are exposed to continuous leaching and require ample supplies of organic matter to replace that lost by washing and dessication.

Cover crops would be very beneficial in preventing wash and by adding humus to the soil. Applications of phosphate and potash are advised for trial. The irrigation system installed in the cane land is a sound proposition and could be extended with advantage.

(iii) *The Sandy or Hill-wash Soils.*

These soils support some important citrus orchards and are typical of the Soufrière valley. The content of sand and gravel is high and drainage is excellent. Leaching, and the loss of the soluble nutrients such as nitrates is therefore to be expected, and this is exemplified in the ready response of such soils to application of organic matter. Bay leaf mould, grass mulch and pen manures are applied with significant results in the crop returns. The content of phosphate and calcium salts is high and fertilisers containing these elements mainly are not in such urgent demand as is potash, which could be applied as a sulphate or nitrate salt, or less efficiently as fresh wood ash.

These soils require ample organic matter and in certain cases irrigation could be practised with advantage in promoting the setting of the lime crop.

Soils of Union Experiment Station.

The soils of Union estate are characteristic of the northern alluvial soils. They are fertile heavy loams. Their excellent tilth suggests that they may be ideal soils for nursery work, where the rapid development of strong root systems is desirable. Owing to their proximity to the river they have been subject to considerable leaching, with the result that they possess an acid reaction. The humus content is lower than would be anticipated from their appearance.

Owing to their excellent tilth the soils should respond readily to small applications of phosphate and potash fertilizer. The humus content should be increased by pen manure. The analyses of three typical samples are given below and compared with Sample 4, an approximation of an average Agricultural soil where all conditions for growth are satisfactory, as suggested for St. Lucia.

UNION. *Citrus Orchard.*

Soil type. (t=topsoil) (s=sub-section)	Texture. Index of texture. (a)	Moisture per cent. (b) at Point of stickiness.	Sand per cent.	Nutrients. Humus per cent. (c)	Nitrogen per cent. (d)	Potash per cent. (e)	Phosphate per cent. (f)	Soil Reaction. Normal Reaction p H value (g)	Exchange Reaction p H value (h)	Lime requirement. Theoretical (tons p. ac.) (i)	Practical (t. p. ac.) (j)
(t) Fine Silt ...	50	55.9	30.5	2.82	0.123	0.0137	0.589	7.15	6.00	2.40	7.2
(s) Heavy Loam	31	39.4	44.0	0.81	0.136	0.0247	0.659	6.17	5.53	...	...
2 *Union.*	*Cacao Field.*										
(t) Fine Silt ...	47	53.2	29.5	0.70	0.115	0.0245	0.640	6.53	5.57	2.13	6.4
(s) Clay ...	50	56.5	31.6	0.23	0.116	0.0295	0.544	6.33	5.82	...	...
3 *Union.*	*Mango Orchard.*										
(t) Fine Silt ...	42	47.7	30.7	0.87	0.187	0.0262	0.713	6.58	5.70	2.45	7.3
(s) Fine Silt ...	43	47.5	23.5	0.87	0.183	0.0238	0.574	7.20	6.10	...	...
SAMPLE 4.	*Average Agricultural Soil, St. Lucia.*										
(1) Loam—Silt	30-45	45.0	30.0	1.5-2.5	0.15-2.0	0.25-0.35	0.01-0.02	6.8-7.4	6-7.0	1 to 2	3 to 6
(2) Silt ...	40-45	48.0	25.0	1.0-1.5	0.10-0.15	0.15-0.25	0.01-0.02	7.0	6.0	...	...

Reference.

(a) *Index of Texture.*—Divide sand per cent. by 5 and subtract result from moisture content at point of stickiness; viz. $\frac{30.5}{5}$=6.1 : : 55.9—6.1=49.8 (or 50.)

(b) The moisture content at point of stickiness.
(c) Humus. Organic matter by combustion using the Chromic acid method.
(d) Nitrogen estimated by Kjeldahl method.
(e) Available Potash, K_2O soluble in Citric acid.

(f) Available Phosphate, P_2O_5 soluble in Citric acid.

(g) Quinhydrone electrode and by Comber colour test.
(h) Total ionisation and response to liming.
(i) To neutralize acidity.
(j) Actual requirement owing to leaching and loss.

Progress in Soil Improvement.

This work has been appreciated in a practical manner by the estate owners and more attention is given to the study of soil conditions, observation on the land flora, and the proper use of manures, both green dressings, pen and artificial manures. Colorimetric soil tests are being encouraged and equipment is introduced for estates. With reference to general soil conditions the report places Union as being one of the best estates in the Island. In this connection attention might be drawn to an earlier report on the soil micro-organisms present in a sample of Union cacao soil examined at Rothamstead, in April 1921. In this report it was stated that the soil was exceptionally poor in bacteria (*Protozoa*). No difficulty has been found in this connection however since reopening the estate. Humus decomposition goes on normally, leguminous green manures of all kinds including lucerne (Alfalfa) grow and nodulate luxuriantly, and mud cultures of nodules have been made and introduced into new importations of clover seed and other leguminosae from abroad, and these have been successfully established and flowered.

The Preparation of good Cacao.

Work on the important problem of improving the local cacao has been carried a stage further since my report on a visit to Cadbury Brothers Ltd., Bournville (in Annual Report, 1927). The Chemist of the Company who has a wide experience of West Indian cacao in field and factory, has given special attention to St. Lucia grades and has reported at length on the merits and demerits of these as considered from the manufacturers' point of view, which is the final criterion of value and purchase. The report is reviewed below:—

Of the twenty-one samples of St. Lucia cacao examined, all but four were well prepared, no completely unfermented bean was present and only one sample showed mould. There seems to be a tendency to gather beans before fully ripe, but no over-ripe or germinated beans were found. The samples were generally free from pests, only one grubby sample being noted. The beans are small compared with the average cacao bean, but a

distinct Criollo strain was present in most samples. Nine samples had a glossy polished appearance with some adhering pulp and closely resembled the Grenada cacao. Four samples were rather imperfect being very dark externally and internally, indicating either that the beans were collected in a diseased condition or had been dried at too high a temperature in an artificial drier.

The samples were slightly better than normal Grenada cacao in being larger and with looser shells. The market price being about two shillings per cwt. less than Grenada, with such improved samples this difference might be reduced to one shilling. One sample was very interesting as being distinctly "bloomy" such as was formerly in demand by buyers.

.....

Detailed confidential notes on the twenty-one named samples from shipments follow, in which weight and general defects are recorded. The most important points are as follows :—

Bean weight runs from 0.92 grams to 1.14 grams, averaging about 1 gram. Hard beans are prominent; dark and dull shells, close shells and mixed close and loose shells were unsatisfactory features. Fermentation was good.

The samples are reported to represent an advance over those seen up to the time of my visit and it is suggested that as this improvement is realised the average price will tend to rise, but the cacao should be more generally reliable (i.e. standardised) to effect this.

The defect of hardness is probably due to gathering in an unripe condition. Calabacillo cacao is liable to hardness even when best methods are used. Overheating in drying would produce a very dark shell and dark cotyledons which definitely lowers the value of the beans.

The collection of small planters' wet cacao for centralised fermenting and drying, the promotion of evenness and regularity in output is regarded as likely to stimulate an upward move in prices of St. Lucia cacao.

The thanks of the Department are due to the Chemist for this report and it is suggested that samples of improved cacao should be sent in for examination and recommendation to the buyers.

Insect Infestation of Cacao.

An inquiry into the infestation of stored cacao was carried out by the Imperial College of Science and Technology, London, and reported in the Empire Marketing Board, illustrated publication No. 24 of December 1929. The report shows that serious infestation causing loss was observed in the St. Lucia brands among others. The important points are abstracted and commented on below for the information of growers.

Of the thirty species of insects associated with stored cacao the most important are two moths *Ephestia* and *Corcyra,* and the weevil *Araecerus.* The former insect *Ephestia elutella* was identified in 1927 as a prominent pest of cacao in stores locally and in this report it reappears as the most destructive agent.

The examination of samples is tabulated below :—

St. Lucia.	*Araecerus.*	*Corcyra.*	*Ephestia.*
Bags examined.		Number of bags infested.	
295.	...	34.	202.

No infestation of *Araecerus* was observed in St. Lucia cacao. Of the many samples examined from fifteen countries the St. Lucia cacao showed the highest infestation by the *Corcyra* moth in various stages of development. This insect has the habit of massing its cocoons close together; it infests nutmegs and other stored products and this infestation appears to commence at the producing end. The infestation by *Ephestia* was also high but it is evident that initial estate infection is supplemented on shipboard and by storage at the Port of London warehouses. It is suggested that serious infestation occurs in warehouses from January to August, and that cacao arriving out of this period tends to remain uninfected.

Work on the fumigation of St. Lucia cacao showed that hydrocyanic acid gas gave highly satisfactory results, and was not unsafe when properly handled. These reports on cacao lead to the conclusion that considerable loss and prejudice is entailed in selling St. Lucia brands which could be removed by classifying and centralising shipments, and by storing the cacao in a suitable store room where insect infestation could be dealt with. This would not be an expensive measure. The action taken by the United States Department of Agriculture under the Food Laws, whereby any cacao containing more than fifteen per cent. infestation by insects or ten per cent. of mould is prohibited importation, may at any time be enforced in other cacao importing countries against undesirable brands.

The contention that West Indian cacao is superior to the West African is in danger of being ignored by importers who prefer larger and continuous supplies of possibly inferior beans; even so production and methods in West Africa are improving at such a rate that it is estimated that the next ten years will see a product as satisfactory in every way as the ordinary West Indian brands.

PROGRESS IN THE CHIEF INDUSTRIES.

SUGAR

The year 1929 was a most depressing one for the Sugar industry owing to the low market value of raw sugar. The factories were producing sugar at barely its selling price about £12 10/- per ton, although two of the St. Lucia factories are regarded as being able to produce the cheapest ton of sugar in the West Indies. The position of the very large sugar factories elsewhere in the West Indies was much more difficult and only the large amount of capital involved made it possible for the larger factories to manufacture sugar selling at below production cost. The whole question of the economic status of the West Indian Sugar Industry has been the subject of enquiry by a Royal Commission led by Lord Olivier, which visited St. Lucia as well as the other West Indian estates during the year. It is hoped that some form of relief may be made available to allow this old and important industry to produce sugar at a reasonable profit.

In consequence of the poor demand for Fancy Molasses, many small cane-growers have ceased to grow cane. The area in cane is therefore less than formerly being now about 4,300 acres as against 4,750 acres in earlier years. The large factories have in general taken up more land, in particular Vanard estate, which is being redeveloped in cane planted on the old banana land. Here, the plant cane crop gave a phenomenal stand estimated at about 60 tons of cane per acre; unfortunately this estate was seriously affected by heavy floods in October. The factories made a larger crop of sugar cane and produced 4,997 tons of sugar as against 4,048 tons in 1928, with a larger quantity of molasses. The amount exported for 1929 was 4,536 tons of sugar as against 4,100 tons in 1928. The average export price however was very low, being £12 10/- per ton of sugar, and the value of these products was much reduced, as shown by the following comparative figures of sugar products exported during 1928 and 1929:—

		1928.	Value. £	1929.	Value. £
Usine Sugar (tons)	...	4,100	63,050	4,536	51,237
Molasses & Syrup (galls)	...	85,784	3,643	127,273	3,047
Muscovado Sugar (tons)	...	...	...	...	...

RUM.

The production of Rum increased during the year with a slight improvement in the market.

The following quantities were made at the local distilleries:—

1928	...	1,323 proof gallons value	£218
1929	...	2,013 „ „ „	£339.

With regard to the alternative crops which the small cane planter is trying in place of sugar cane, the productive cultivation of short period crops has been kept before him, such as cassava, tanias, yams, sweet potatoes, and peas and beans for export. These cash crops are intended to provide a moderate return until the various fruit trees being planted commence to bear fruit. The provisioning of ships with fresh provisions is gradually being extended.

Cane Varieties.

A further introduction of selected new cane varieties from Barbados has been released from quarantine and is now established in the factory plots. Two of these varieties, B 67 and B 417 show distinct promise. An introduction of Java canes obtained through the courtesy of the United States Department of Agriculture, has resulted in the distribution from quarantine of two most productive varieties P.O.J. 2878 and P.O.J. 2727, for planting in the factory plots. The Java cane fields were estimated to consist of 90 per cent. of the former variety (P.O.J. 2878) in 1929, and the behaviour of the cane locally is being carefully watched.

Cultivation methods are improving. Draining and the formation of wider cane beds in particular, is being more carefully attended to. All the factories are now experimenting with the various green manures introduced, and a large demand for seed is being provided for at Union Agricultural Station.

CACAO.

The Cacao market has been poor and low prices were received during the year, ranging from 45/- to 52/6 per cwt. The total crop was below the average, being affected by wet weather diseases and difficulties in drying the beans. The following figures give the exported amounts:—

1928	...	11,006 cwt.	valued at £27,321
1929	...	8,906 „	„ „ £18,864

Much of the local cacao is being shipped to Trinidad where it is regraded and bulked for export to the United Kingdom with the added safeguard of inspection by the Cacao Growers Association. Thus by means of bulk and reconditioning, this cacao fetches better prices on the markets than if exported direct from St. Lucia. This is a strong indication that local growers themselves could capture an extra 2/- to 3/- per cwt. by organised pooling and grading of their cacao, and remove the market bias against small lots of varying quality.

The presence of "mule" or naturally barren trees in the cacao field is wasteful, and planters are recommended to concentrate on the trees which are naturally productive and bear the greatest proportion of the crop. The barren trees may then be used for budding with known high bearing strains. A few such strains are being isolated and it is hoped further to develop this work at Union during the present year. The introduction of a semi-wild cacao resistant to root disease and serviceable as a rootstock is being considered.

The economic factor in cacao production now is to produce more per tree as against number of trees per acre, by growing only known valuable strains on healthy root stocks.

THE LIME INDUSTRY.

Although weather conditions were apparently not very favourable a good Lime crop was made and realised firm prices. Concentrated Lime Juice varied in market prices from £28 to £20 per pipe c.i.f. Handpressed Lime Oil realised prices ranging from 54/- to 74/- per lb., and Distilled Oil realised from 33/- to 25/- per lb. towards the end of the year.

The total exported crop of the Colony calculated in barrels of fruits was:—

1928	...	30,107 barrels,
1929	...	37,345 barrels, but was of lower value

£29,531 as against £29,769 in 1928. The increase in production is a partial return to pre-withertip days and is by no means entirely due to weather conditions, or any extension of cropping area. Improved cultivation is being practised particularly in the Soufrière district and manures and mulches are showing good effects.

The advantages of limes budded and grafted on sour orange are being appreciated, and more of these plants are being ordered. The commercial lime immune to withertip has not yet materialised. Further crosses are needed both in the Trinidad and Dominica varieties before a lime equal to the present one in oils and juices becomes available for planting. Material is therefore being provided at Union Station to proceed with the development of an immune lime. With regard to the green lime trade, shipments of green limes in cold storage to England received very favourable comment. The green lime trade needs advertisement in Canada in order to popularise the lime, the uses of which are almost unknown.

COCONUTS.

Coconut production continues to increase and the exported quantity of nuts during 1929 was double that of the previous year. The export of copra was also greater. Owing to poor demand for coconut soap and oil, the Oil Mills closed down towards the end of the year.

The price of copra fell from £25 to £19 per ton c.i.f. The total export value of coconut products was £10,916 as against £9,411 in 1928.

The following amounts were exported:—

		1928	Value. £	1929	Value. £
Coconuts (number)	...	141,667	444	295,983	1,032
Coconut Oil (gall.)	...	931	184	—	—
Copra (lb.)	...	705,721	8,690	803,889	9,878
Coconut Meal (lb.)	...	8,994	38	3,874	6

The plantations in general are in good health, and maintenance is improving. The use of suitable cover crops is being extended. In certain of the older plantations in full bearing the annual crop averages 106 nuts per tree, whilst individual specimens may yield as many 150 to 170 nuts per annum. Copra making by the use of oven drying is commonly practised.

The dwarf coconut introduced from the Malay States has fruited on some estates and is carrying a heavy crop. This nut is becoming popular owing to its early fruiting, and dwarf habit allowing closer spacing.

PROGRESS IN MINOR INDUSTRIES.

FRESH FRUIT.

Marked attention has been given to the exportation of fresh fruit. Orchards are being formed in suitable parts of the Colony, and more fruit is being crated.

The total export of fresh fruit is given below:—

	1928. £	1929. £
Oranges	50	129
Mangoes	1,014	1,383
Avocados	96	225
Bananas	338	509
Miscellaneous ...	2,843	1,560
	£4,341	£3,806

The best variety "Julie" and other mangoes have been shipped in crates to England, to Canada and to Bermuda. Marketing and shipping conditions have been tested using only selected "Julie" mangoes put up in crates. Experience proves that this variety can be put on the markets in first class condition, and realises a good price. Avocados have been shipped to similar markets and although the general result has not been so good owing to the variable forms of fruit shipped, the final conclusion is that hard selected fruit carefully handled and exported in half-crates in cold storage, will arrive in good condition and sell at a good price.

The sales of both these fruits will be increased when the fruits are better known. Attractive labels on neat and well made crates, containing carefully packed, selected fruit, are first essentials in entering new markets with unfamiliar produce.

The orange and grapefruit trade has also increased and Canada has been supplied with local oranges, brightly coloured by a simple process. The question of sizes, grades and crates is also very important for the citrus market, open as it is to established Californian competition.

The difficult problem of a marketing agency in Canada was well discussed at the recent Conference of Agricultural Officers in Trinidad with other problems of the fruit trade, and measures to deal with these problems are to be worked out in conjunction with the Governments concerned. The provision of a local fruit packing house, and cold storage for fruit, vegetables and dairy produce is a necessity now that exports are growing and time is required to inspect, crate, and precool produce previous to shipment. Legislation is being prepared to promote shipment of certified produce.

BAY OIL AND BAY RUM.

The Market for Bay Oil was not very firm during the year. Bay Rum sales were fair and this product is becoming popular with visitors passing through on the Canadian National and other steamships. The exported products amounted to £2,210 as against £2,554 in 1928.

AGRICULTURAL OUTLOOK.

In view of the difficulties experienced in disposal of the main crops at a reasonable profit, agriculturists have turned their attention to other crops. As already indicated, the provision of fruits and vegetables, preserves and canned products to the growing Canadian market, opens new possibilities to the producer. That this is being realised is shown in the steady growth of export trade on items which previously were shipped in a desultory fashion.

Attention is being directed to the possible tomato market from March to May when Northern shipments are falling off and temperate grown tomatoes are not available.

Most planters are including the newer orchard crops as a normal extension and a demand is arising for the purchase and export of produce through a Central Depot and Packing Station, and it is hoped that the plans for this work will be shortly put into operation.

The total value of the principal agricultural exports grouped according to class is shown in the attached list as £129,031 as against £149,729 for the previous year. This depreciation is mainly due to the low value of staple products, Sugar and Cacao. Thus labourers from these industries have been compelled to seek other employment or emigrate. The Department has encouraged the development of labourers' gardens and small holdings in order to provide a subsistence for these useful workers until the main industries recover, or the developing fruit and vegetable trade becomes more remunerative.

The opening up of the interior by a new road system will afford employment and further opportunities for settlement. There is thus a hopeful outlook for agriculture particularly in the expanding Canadian market for crops such as can be now grown by small holders and the large estates alike; whilst prices for the staple crops appear to have reached a basic point and can hardly go lower. For these more economic production is to be aimed at.

The advantages of a genial climate, and freedom from hurricanes, with a very fertile soil and an excellent harbour, are factors which will go far to consolidate the efforts of the planting community.

EXPORTS FROM ST. LUCIA.

		Quantities 1928	Value £	Quantities 1929	Value £
SUGAR PRODUCTS :—					
Sugar, Vacuum Pan	Cwt.	82,000	63,050	90,720	51,237
Molasses and Syrup	Gall.	85.784	3,643	127,273	3,047
Rum ...	p. Gls.	1,323	218	2,043	339
			£66,911		£54,623
CACAO PRODUCTS :—					
Cacao ...	Cwt.	11,006	27,321	8,906	18,864
LIME PRODUCTS :—					
Concentrated Lime Juice ...	Gall.	18,028	4,998	21,259	5,879
Raw Lime Juice ...	,,	12,598	631	40,675	3,212
Distilled Lime Oil	,,	1,159	12,261	685	9,049
Essential H.P. Otto of Limes ...	,,	518	9,783	329	9,633
Green Limes ...	Barrels	1,553	2,014	1,165	1,758
Lime Seeds ...	Lb.	7,428	45	...	...
			£29,732		£29,531
COCONUT PRODUCTS :—					
Coconuts ...	No.	141,667	499	295,983	1,032
Copra ...	Cwt.	6,301	8,690	2,177	9,878
Coconut Oil ...	Gall.	931	184	...	...
Coconut Meal ...	Tons	4	38	1	6
			£9,411		£10,916
HONEY PRODUCTS :—					
Honey ...	Lb.	21,263	237	47,270	552
Bees-Wax ...	,,	372	20	451	19
			£257		£571
BAY PRODUCTS :—					
Bay Oil ...	Gall.	10,727	1,957	10,644	1,901
Bay Rum ...	,,	258	597	204	309
			£2,554		£2,210
SPICES :—					
Nutmegs ...	Lb.	5,246	326	9,030	409
Mace ...	,,	981	85	2,078	277
Kola Nuts ...	,,	22,154	283	20,305	204
Miscellaneous ...	,,	...	...	985	27
			£694		£917

EXPORTS FROM ST. LUCIA.—(*Continued.*)

		Quantities 1928	Value £	Quantities 1929	Value £
VEGETABLE PRODUCTS :—					
Plantains ...	Bchs.	...	...	...	...
Arrowroot ...	Lb.	...	...	...	...
Farine ...	,,	9,151	70	17,311	132
Yams ...	,,	...	...	...	...
Miscellaneous Vegetables ...		...	57	...	95
			£127		£227
FRESH FRUIT & PRODUCTS :—					
Bananas ...	Bchs.	5,543	338	6,818	509
Mangoes ...	Brls.	...	1,014	...	1,383
Oranges ...	No.	28,006	50	64,173	129
Grapefruit ...	,,	3,326	15	4,261	21
Pine Apples ...	,,	...	7	...	83
Pears (avocado) ...	,,	...	96	...	225
Mixed Fruit ...		...	2,843	...	1,560
Preserved Fruits		...	1	...	2
Jams, Jellies, etc.	Lb.	...	5	...	17
			£4,369		£3,929
FOREST PRODUCTS :—					
Boards (native) ...	C. Ft.	546	52	169	15
Cedar ...	,,	70	12	158	30
Firewood ...	Cords	832	432	927	465
Logwood ...	Tons	940	2,338	1,013	2,713
Pimento Wood ...	C. Ft.	955	113	1,078	143
Hardwood ...	,,	...	...	1,796	143
Brooms ...	Doz.	916	38	1,458	54
Charcoal ...	Bags	46,371	3,107	42,879	2,505
Furniture (Household)		...	53	...	23
			£6,145		£6,091
LIVE STOCK & PRODUCTS :—					
Cattle ...	No.	14	96	...	...
Poultry ...	,,	...	...	...	...
Hides ...	,,	1,663	654	1,308	516
Skins ...		1,902	88	1,586	55
Shells—Turtle ...	Lb.	499	417	133	70
Fish Oil ...	Gall.	4	2	14	7
Horses ...	No.	103	679	...	325
Mules ...	,,	3	26	...	24
Asses ...	,,	22	25	...	8
			£1,987		£1,005
MISCELLANEOUS PRODUCTS :—		...	221	...	147
Total Exports		...	£149,729	...	£129,031

AGRICULTURAL INSTRUCTION IN THE PRIMARY SCHOOLS.

REPORT OF THE AGRICULTURAL SUPERINTENDENT ON THE TEACHING OF AGRICULTURE IN THE PRIMARY SCHOOLS OF ST. LUCIA DURING 1929.

The year 1929 marks the 21st year of instruction of the Primary Schools in Agriculture. The examination was conducted by the Agricultural Instructor between October 16th and December 3rd.

The number of children presented for examination was 372 as against 381 last year showing a decrease of 2·4 per cent. Forty-two girls were included in the Agricultural Class this year. This number should be increased by schools in purely agricultural districts such as Mon Repos.

The distribution of economic plants from the School gardens is still unsatisfactory. Many teachers fail to see the interest this would add to their work, and the practical benefits which would accrue to the district. The selection of plants for stock is still much neglected in spite of the emphasis laid on this in last year's report. It is disappointing to find that the majority of plants sent out from the school after having been successfully budded or grafted, either die or are at a standstill because the stock plants were bad.

Another very weak point in school gardening is the disinclination of teachers to reform the garden beds. The general layout of the garden should be gone over periodically; the beds should be reshaped and the walks and drains should be kept within proper limits. These faults call for prompt attention and full marks can only be given to gardens where the general standard of work is seen to advance yearly. A few schools have extended their propagation work to peasants holdings, especially in the topworking of fruit trees and this should be adopted by all the schools as far as possible.

The general condition of the gardens was good. A satisfactory interest is taken in orchard work, and the classes are constantly realising the importance of constant attention in growing fruit plants. The position of most of the Gardens, however, is prejudicial to much improvement and plans are being prepared to provide half an acre of good land and a supply of tools and fencing for each school. This will permit of a small orchard, vegetable and flower garden, with a possibility of raising enough revenue to provide for improvements. In the meantime arrangements have been completed for the provision of tools annually through the Agricultural Department.

E. A. WALTERS,
Agricultural Superintendent.

EXAMINER'S REPORT.

Castries Anglican Juvenile.

The site of the old garden is now occupied by the Rectory, and a new garden was presented this year. The fruit trees of the old garden have been pruned back hard and successfully transplanted. At the time of inspection the garden was cropped with a variety of English vegetables suitable for the local shipping trade. Budding and grafting of economic plants has been carried out successfully on a fairly large scale, but better selection of stock plants is desirable. A portion of the plants and vegetables grown is regularly distributed to the pupils, a very useful effort which should be practised in all the agricultural classes.

Castries R.C. Boys' Juvenile.

The agricultural class of this school is a large one, but the garden though small is arranged and worked in a manner to demonstrate the class lessons. Appreciable improvement in budding and grafting has been made but careful selection of stock plants is necessary. The theoretical knowledge was good and the garden was cropped with a good selection of English vegetables at the time of inspection. Box garden work could be arranged with advantage to give the smaller boys more practice in handling plants.

Castries Wesleyan Juvenile.

Improvement is evident in the practical work of this school, but the garden plot is small and the work could be greatly enhanced by the use of plant boxes. Budding and grafting of economic plants was very satisfactory especially in the case of the avocado pear. The Teachers do too much of the practical work and this should be corrected by allowing different boys to do the grafting and budding.

Micoud Juvenile.

The theoretical work was very satisfactory, and although the garden is sandy, good crops of English vegetables were grown, aided by the incorporation of large quantities of sea weed and stable manure. Seedlings have been grown and distributed to the pupils of the agricultural class, and the boys are being encouraged to work in groups at home and grow these seedlings. Grafting of economic plants by various methods had been carried out, but better selection of both stocks and grafts is necessary.

Riviere Doree Anglican Juvenile.

This garden deserves special mention because of the evident care that has been exercised in arrangement and cultivation. The beds are neat and well stocked with a variety of economic plants. Budding and grafting has been carried out on a moderately large scale and the selection of stock plants is good. The Revd. Manager is keenly interested in the practical work of the garden and the good effects of this are shown in the results obtained.

Soufriere Boys' Juvenile.

A new garden was shown this year. It is proposed that the old garden should be planted with reliable fruit trees to form a useful orchard. A variety of vegetables was under cultivation at the time of inspection and the pupils were much interested in their work. The agricultural class had visited the neighbouring peasants' holdings and had successfully grafted fruit trees. This should be encouraged.

Choiseul Boys' Juvenile.

Good use has been made of the garden, and the practical work is very satisfactory. A part of the garden is laid out as an orchard in which only approved varieties of fruit trees should be planted. The pupils are very interested in the garden and most of the boys bud and graft readily. A large number of selected budded and grafted plants should be raised and distributed to the pupils for planting at home.

LaRessource Combined.

The practical work at this school is satisfactory, both boys and girls being keenly interested. Several old mango trees in the vicinity of the school have been top worked by shield budding and grafting, and this work is being gradually extended in the district. The selection of stock plants requires better attention. The distribution of plants to peasants and pupils during the year consisted of 45 grafted "Julie" mangoes and 23 budded oranges. The Teachers should examine the plants put out by the pupils at their homes from time to time, and record results in the garden note books.

Dennery Boys' Juvenile.

The work at this school has shown marked improvement. Grafting of selected mangoes has been practised and the plants have been given to pupils for planting at home. The agricultural class visited holdings in the district and successfully top-worked old mango trees. The distribution of plants during the year consisted of 19 grafted "Julie" mangoes, and a large number of vegetable seedlings. Advantage should be taken of the overflow of the local water reservoirs for irrigation during the dry season.

Canaries Juvenile.

This school has been removed to the building formerly used as Presbytery, and a great deal of practical work has been carried out near the new school in addition to work in the old garden. The lime trees have been cleaned and manured, and waste land has been converted into useful vegetable gardens. The lay out of the old garden still requires improvement. Selected plants should be raised and distributed to the pupils for planting at home in order to stimulate their interest in the school garden.

Laborie Boys' Juvenile.

Liberal applications of pen manure and green dressings should be dug into this garden and the beds should be reformed before next year's work is started. The soil is poor and deficient in humus, results therefore are not very instructive. Grafting of economic plants is fairly satisfactory; budding has not made much progress. Sour orange seeds should be sown and the seedlings carefully selected and grown under proper conditions to form stock plants before budding is attempted. The theoretical knowledge was good.

Anse-la-Raye Juvenile.

The vegetable garden has been transferred to the Presbytery yard, on account of the frequent flooding of the old garden, and useful work is being carried out. The beds were neatly laid out and cropped with a variety of useful vegetables; budding and grafting received proper attention and the boys were quite skilled in the practical work. The old garden is laid out for an orchard and only selected varieties of trees should be planted.

Vieux-Fort Boys' Juvenile.

This garden has received careful attention. The wind breaks have been efficiently kept up thus enabling useful work to be carried out. Budding requires more care and should be practised before the dry season sets in. Grafts for avocados should be selected from good trees and not taken at random. Peanuts might be included in the crops of the garden. The beds should be planted in green dressings before the dry season instead of being left bare.

Forestiere Wesleyan Combined.

The practical work and condition of the garden was very satisfactory. Nearly all the land around the school is planted in various crops. This gives the school an attractive appearance. The beds were cropped with ginger, garlic, onions, yams, cabbage, bananas, and other vegetables at the time of inspection. Oranges appear to do well in the district and a large number of selected plants could be budded and distributed to the pupils and peasants. A number of sour orange trees are growing in this district and the best of these might be cut back and budded with selected orange budwood.

SALTIBUS JUVENILE.

The results here were not as good as formerly, probably owing to the illness and absence of the Head Teacher. Plants for stock should not be utilised at random but should be carefully selected and grown. Plants successfully budded or grafted on indifferent stocks cannot thrive and generally die out. Garlic, onions, and peanuts should be added to the crops cultivated here and economic plants and seedlings should be grown and distributed to the pupils.

BABONNEAU COMBINED.

The results at this school leave room for considerable improvement. The practical work is poor and requires better management. The garden is large and one section should be planted in selected fruit trees to provide grafts and budwood. Some of the remaining beds should be cropped with onions, tomato, cabbage, peanuts, leek, and other vegetables; sour orange and mango long seedlings should be raised for budding and grafting at home. The girls should be taught practical agriculture so as to enable them to grow English vegetables for the local market. This would be useful training for them to put into practice after leaving school. At present they are taught only theoretical agriculture.

MON REPOS JUVENILE.

The agricultural work has shown improvement, but much more could be done in the garden and on the unoccupied land which belongs to the school. About a dozen grafted mango trees should be put out in the school lands and old mango "Long" trees should be cut back and top-worked. Economic plants should be raised and distributed among the pupils, and the girls of the upper standard should be taught agriculture.

List of Marks and Standing of Schools in Agricultural Teaching, 1929.

Schools.	No. of Pupils Examined.	Condition and use made of garden.	Practical work and knowledge.	Theoretical Knowledge.	Total.	Percentage.	Result Note.
Possible Marks	—	10	10	10	30	100	—
Castries Anglican Juvenile	35(a)	10	9	9	28	93·3	E.
Castries R.C. Boys' Juvenile	79	8	9	10	27	90	E.
Castries Wesleyan Juvenile	21	8	9	10	27	90	E.
Micoud R.C. Juvenile	18	9	8	10	27	90	E.
Riviere Dorée Juvenile	10	10	9	8	27	90	E.
Soufrière R.C. Boys' Juvenile	37	9	9	8	26	86·6	V.G.
Choiseul R.C. Boys' Juvenile	18	9	9	7	25	83·3	V.G.
La Ressource R.C. Combined	10(b)	9	10	6	25	83·3	V.G.
Dennery R.C. Boys' Juvenile	19	7	9	8	24	80	V.G.
Canaries R.C. Juvenile	23(c)	8	7	8	23	76·6	V.G.
Laborie R.C. Boys' Juvenile	30	8	7	8	23	76·6	V.G.
Anse-la-Raye R.C. Juvenile	15(d)	8	8	7	23	76·6	V.G.
Vieux-Fort R.C. Boys' Juvenile ...	13	8	7	8	23	76·6	V.G.
Forestiere Wesleyan Combined	9(e)	8	8	7	23	76·6	V.G.
Saltibus R.C. Juvenile	12	7	6	7	20	66·6	G.
Babonneau R.C. Combined	17(f)	7	6	7	20	66·6	G.
Mon Repos R.C. Juvenile	6	7	5	6	18	60	G.

(a) including 15 girls. (b) including 2 girls. (c) including 6 girls. (d) including 6 girls. (e) including 3 girls. (f) including 10 girls.

R. W. NILES, *Examiner.*
6/12/29.

RESULTS OF PUPIL TEACHERS EXAMINATION IN AGRICULTURE, 1929.

Agriculture.

Name.	School.	Possible Marks 100.
Julius Denis ...	Castries R.C. Boys'	90
Charles Amos ...	Dennery Boys'	61
Alexander Hunt ...	Micoud Boys'	54
Clive St. Croix ...	Choiseul Boys'	52
Nelson Sylvestre ...	Micoud Boys'	50
Joseph St. Helen ...	Saltibus	44
Jonas Lesmona ...	Dennery Boys'	42
Kenny Williams ...	Vieux-Fort	40
Philip Finisterre ...	Gros-Islet Juv.	36
Kent Hippolyte ...	Castries R.C. Boys'	13
1st Year.		
Lennox Chalon ...	Choiseul Boys'	77
Willie Andrew ...	... ...	58
Jerome Peter ...	Vieux-Fort	56
Nelson Paul ...	Vieux-Fort	54
Joseph Rosemain ...	Soufrière	50
Charles Eugene ...	Castries R.C. Boys'	36
Boniface Edmund ...	Laborie Boys'	33
2nd Year.		
Anthony Polius ...	Dennery Boys'	61
Harold R. Gajadhar ...	Forestierre	55
Remy Fannis ...	Canaries Juv.	50
J. C. Beausoleil ...	Soufrière	39
3rd Year.		
John Alexander ...	Saltibus	50

R. W. NILES,
Examiner.

February 8th, 1930.

AGRICULTURAL INSTRUCTION.

No course of lectures to Teachers was given during 1929 owing to economy and to the fact that the Agricultural Instructor was dealing more fully with school instruction.

The Agricultural Superintendent paid fifty prolonged visits and many shorter visits to estates and holdings during the year. The Assistant Agricultural Superintendent was appointed Agricultural Instructor, with an adequate travelling allowance to enable him to devote full time to the country districts and particularly to peasant holdings and school work, in order to improve and stimulate production and to develop co-operation.

A general survey was first made of peasant holdings, after which it was decided to concentrate for a period on a specified district where demonstrations and plot-work would be conducted and the local requirements studied as far as possible. This has been carried out in the Gros Islet, Dennery and Micoud districts, the work consisting of the renovating of useful but neglected crops, the introduction of new or more suitable orchard crops and various ground provision crops, and attention to the formation of manure pens.

Co-operation in working small areas, in sweating cacao and marketing provisions and fruit has been urged with moderate success but frequent visits are necessary to firmly establish this teaching. The advantage of a Vegetable and Fruit Depot will be a strong stimulus to production. On the whole peasants respond to advice readily and are anxious to participate in the fruit and vegetable trade. The following economics have been distributed as part of this activity.

Coffee	4,100
Mango grafted	55
Citrus budded	237
Lime plants	4,850
Avocados	32
Other plants	1,182
Total	10,456

Together with a large quantity of seeds and seedlings. A very large demand has to be prepared for in anticipation of new orders.

An elementary course in Botany, Chemistry and Agricultural Science was given by the Agricultural Superintendent to Forms IVa and V of St. Mary's College, Castries, throughout the year.

ADMINISTRATION.

REPORT OF THE WORKING OF THE REUNION ESTATE AND LAND SETTLEMENT.

Land Settlement.—Of the the 46 lots comprising the Reunion Land Settlement, 41 have completed payments, making a total sum of £925 5 7 to date. Payments are still being made on the five lots which remain, and the instalments where fairly well collected.

Choiseul Village Extension.—The remaining twenty-three lots in this Extension remained unsold during the year.

The Revenue derived from Reunion Estate was:—

Instalments on Land Settlement	£12	10	1
Instalments on Village Extension	6	8	0
House Lots and Land Rents	2	5	0
Rent of Reunion Bungalow	4	0	0
	£25	3	1

The lots were cropped in ground provisions and fruit plants.

Reunion Estate.—Pending the sale of this estate, the area has been rented out for the cultivation of suitable crops in order to keep the land in good condition.

CORRESPONDENCE AND DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

Two hundred and five Minute Papers, and one thousand four hundred and thirty-two letters were dealt with during the year; information was supplied and official returns rendered for the Blue Book, Imperial College of Tropical Agriculture, Trinidad; Imperial Bureau of Agricultural Parasitology, England; The Imperial Institute, London; Imperial Bureau of Soil Science, England; and the International Directory of Pedigree Stock Breeders, England.

The following papers were printed and distributed:—

Advisory Circular Nos. 1 to 5 and Export Circular Nos. 1 to 5. Report on some Cultivated St. Lucia Soils by H. H. Croucher, B.Sc., Imperial College of Tropical Agriculture, Trinidad.

The final paper on "St. Lucia Banana Lands" by the Agricultural Superintendent, appeared in Tropical Agriculture. Several reports and publications were presented to the Department, and are gratefully acknowledged.

The following books were added to the Library:—

"Marketing of Agricultural Products" by J. E. Boyle, Ph.D.; The Cultivation of Citrus Fruits, by Hume; "Families of Flowering Plants: I. Dicotyledons" by Hutchinson; "Sisal Production and Preparation" by Hamel Smith; and "Diseases of Tropical Plants" by Cook.

EXPENDITURE AND REVENUE.

Personal Emoluments	£1,032	2	2
Travelling Allowance to Agricultural Superintendent	100	0	0
Travelling Allowance to Agricultural Instructor	120	0	0
Transport Allowance for visiting Officers of Imperial Department of Agriculture	14	0	2
Labour, Union and Castries Stations	404	1	10
Seeds, Plants and Manures	119	19	6
Diverting Union River to prevent floods	25	0	0
Fencing, Gates, etc., Union Station	10	0	0
Transport and Animals	24	11	0
Miscellaneous Requisites including Circular Saw, Tools, & Nursery Supplies	71	18	3
Printing, including Publicity work and Purchase of Books	13	11	10
Minor Repairs to Buildings, Union and Castries Stations	14	15	6
Freight and Transport of Plants	18	17	0
Experiments in Grading, Packing, etc.	49	12	6
Contingencies including Expenditure on Plant Diseases	21	6	3
Improvements to Office, etc.	61	9	8
	£2,101	13	8

REVENUE.

Revenue derived from sale of nursery stock, produce, &c., from the Agricultural Stations was:—

Botanic Gardens, Castries	£33	5	10
Experiment Station, Reunion	1	14	9
Union Station	33	17	2
Land Settement, Rents, &c.	25	3	1
	£94	0	10

OFFICIAL VISITORS TO THE STATIONS.

His Excellency Sir Frederick Seton James, K.C.M.G., K.B.E., Governor and Commander-in-Chief, Windward Islands, and Lady James; His Honour the Administrator C. W. Doorly. and Mrs. Doorly; His Honour Major Peebles, Administrator, St. Vincent; Professor H. A. Ballou, M. Sc., Commissioner of Agriculture for the West Indies, Trinidad; Mr. G. A. Jones, Assistant Commissioner of Agriculture; Dr. H. R. Briton Jones, D. Sc., Ph. D. (Lond.), Mycologist; and Students; Mr. G. Evans, Principal, Imperial College of Tropical Agriculture, Trinidad; Mr. R. O. Williams, Department of Agriculture, Trinidad; Mr. H. E. Hayward, Photographer; Professor T. Barbour, Director, Harvard University Museum.

The following visits on special work were made during the year:—

Professor S. F. Ashby, of the Imperial Bureau of Mycology, visited on whither-tip disease of limes and a general survey of plant diseases.

The Sugar Commission appointed by the Imperial Government, and headed by the Right Honourable Lord Olivier, P.C., K.C.M.G., visited the Island and examined the condition of sugar production and of the sugar industry generally.

Mr. Karl Walter of the Horace Plunkett Foundation of Economics, paid a visit to promote ideas of co-operation in agriculture.

Captain J. M. Wingate, Agricultural Officer, Gold Coast, paid a short visit on the possibilities of sisal production.

Dr. Wardlaw, Plant Pathologist and Physiologist, revisited St. Lucia to resume his studies on Panama Disease.

Other Visitors to the Stations.

There was a large number of visitors to the Stations during the year.

STAFF CHANGES.

The Agricultural Superintendent was absent on vacation leave from July 1st to 15th.

Mr. W. W. Arno, Clerk to the Agricultural Superintendent, died on November 27th.

Mr. R. du Boulay was transferred from the Prisons Department, to be Clerk to the Agricultural Superintendent, on the 16th December.

Mr. Bennett Williams, Plant Inspector, was absent on vacation leave from December 21st to December 31st.

Mr. W. A. Lewis was appointed probationary Copyist from 1st September.

METEOROLOGICAL OBSERVATIONS.—APPENDIX I.

STATION, CASTRIES, St. LUCIA, B.W.I.

Longitude=60° 59′ 49″ W. Latitude=14° 0′ 36″ N. H =10ft.

Month.	Air Temperature.				Absolute Max. and Min.			
	7 a.m.	12 noon	5 p.m.	Mean	Max.	Date	Min.	Date
January	77·7	82·7	79·2	79·8	86	3rd	66	1st
February	75·0	82·2	79·5	78·3	86	6th	67	2nd
March	77·1	85·8	80·9	81·2	87	12th	65	7th
April	77·5	84·7	82·4	81·5	89	24th	68	3rd
May	78·6	85·1	81·5	81·7	89	3rd	74	1st
June	78·3	85·2	83·9	82·5	89	5th	74	3rd
July	78·5	83·2	83·2	81·6	89	11th	74	17th
August	77·9	85·5	80·8	81·4	92	2nd	74	1st
September	78·7	85·8	81·6	82·0	89	8th	74	1st
October	78·7	86·0	81·2	81·9	89	2nd	74	6th
November	78·5	84·9	80·9	81·4	89	13th	74	30th
December	78·2	85·3	80·7	81·4	88	1st	73	26th
Year ...	77·9	84·7	81·3	81·3	92	2nd Aug.	65	7th Mar.

APPENDIX II.

THER. *ht.*=3′ 0″ RAINGAUGE *hr.*=1′ 0″. STATION CASTRIES.

Month.	Rainfall (inches)			Weather.		Wind. No. of Observations of								
	Total	Max.	Date	Days of Rain	Days of Gales.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm
January ...	3·02	0·55	11th	19	0	0	1	54	27	0	0	0	0	11
February	3·06	0·53	10th	17	0	0	0	52	30	0	0	0	0	2
March ...	2·22	0·52	21st	16	0	0	0	66	23	0	0	0	0	4
April ...	0·91	0·24	8th	7	0	0	10	66	12	0	0	0	0	2
May ...	4·05	0·75	9th	21	0	0	2	69	20	0	0	0	0	2
June ...	8·88	1·25	19th	24	0	0	0	60	28	0	0	0	0	2
July ...	10·10	2·03	13th	21	0	0	0	75	16	0	0	0	0	2
August ...	20·63	2·89	19th	27	0	0	1	52	19	0	0	0	0	20
September	9·73	1·59	1st	26	0	0	0	41	20	0	0	0	0	29
October ...	13·49	4·85	5th	21	0	0	0	56	20	0	0	0	0	17
November	20·62	3·25	14th	25	0	0	0	56	12	0	0	0	0	20
December	5·33	0·53	1st	27	0	0	5	63	18	0	0	0	0	7
Year ...	102·04	4·85	5th Oct.	251	0	0	19	710	245	0	0	0	0	118

MEMORANDUM ON METEOROLOGICAL CONDITIONS DURING THE YEAR 1929, SAINT LUCIA, B.W.I.

Rainfall.—The rainfall recorded at the Botanic Gardens, Castries, for the year 1929 was 102.04 inches. This was 11.79 inches above the average for the last 39 years (=90.25 inches). Maximum precipitation occurred on October 5th, when 4.85 inches of rain fell at Castries. In the wetter parts of the Colony however the rainfall ranged from 6 inches to 13.5 inches on this date.

The distribution of rainfall throughout the year was well marked, a partial drought occurring during the normal dry season, the period mid-February to the beginning of May. The wet season beginning in July was marked by heavy rainfall which continued throughout September, October and November, most stations recording above 12 inches rain for each month.

Temperature.—Temperature records at the Botanic Gardens, Castries, show a Mean Noon Temperature of 84.7 degrees in the shade. The maximum temperature was 92 degrees the minimum temperature was 65 degrees, a temperature range of 27 degrees; air temperatures generally were lower.

Weather.—The weather generally was fair and cool, with few storms. A heavy rain and thunderstorm on the night of October 5th resulted in floods on several estates.

Light earth shocks were fairly frequent during the year.

APPENDIX III.

RAINFALL RETURNS, 1929.

Observation Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Maximum in one day and date.		Total days of Rain.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.		
Gros Islet, Reduit Estate	2·45	0·97	0·79	0·63	1·65	5·10	6·23	11·98	8·00	11·32	11·81	3·86	64·79	6·80	Oct. 5th	180
Castries, Corinth ,, ...	4·05	2·22	1·60	1·45	3·31	8·47	10·15	14·79	11·16	12·86	12·92	5·26	88·24	6·64	,, 5th	238
* Marquis Estate ...	3·00	1·58	1·40	0·73	3·29	5·17	8·23	11·62	8·72	...	...	4·12	43·74	2·15	July 16th	135
Union Exper. Station ...	3·22	1·65	1·17	0·76	2·39	6·10	8·52	15·16	13·62	11·42	15·69	6·44	86·14	4·86	Oct. 5th	254
Choc Estate ...	2·57	1·72	1·12	0·86	2·63	5·91	7·35	12·62	8·71	12·56	13·84	4·74	74·63	6·10	,, 5th	212
Botanic Gardens ...	3·02	3.06	2·22	0·91	4·05	8·88	10·10	20·63	9·73	13·49	20·62	5·33	102·04	4·85	,, 5th	251
The Barracks, Vigie ...	2·29	2·19	1·42	0·58	3·06	6·53	9·08	13·89	8·77	13·34	12·98	4·03	78·16	8·65	,, 5th	201
Soucis Estate, Cul-de-Sac	3·40	2·64	2·21	1·17	5·09	6·47	8·65	12·86	9·85	11·42	17·50	6·05	87·31	5·05	,, 5th	236
Crown Lands Est. ,, ...	4·75	3·89	2·51	1·13	6·10	8·40	10·72	14·24	19·83	16·95	21·82	11·46	121·80	6·75	,, 5th	261
La Perle Est., Roseau	4·12	3·89	2·20	0·30	5·15	6·80	8·80	14·10	11·05	19·90	18·80	7·78	102·89	10·50	,, 5th	185
Mont D'Or Est., ,, ..	3·68	3·43	2·72	0·93	4·52	7·84	10·68	16·39	15·63	23·36	21·86	9·16	120·20	12·50	,, 5th	262
Belair Estate, Roseau	3·13	2·83	1·77	0·51	2·26	5·34	8·25	14·98	12·65	22·21	19·57	8·63	102·13	13·50	,, 5th	232
Vanard ,, ,, ...	4·32	3·64	2·36	1·39	5·58	7·97	12·60	15·20	15·95	25·15	21·89	9·66	125·71	12·13	,, 5th	228
Ravine Poisson, Estate	6·14	5·54	1·45	2·05	7·35	11·36	16·61	16·83	26·65	22·37	29·22	13·96	169·53	8·60	,, 5th	223
Soufrière, La Perle Estate	5·90	4·58	2·57	0·97	5·62	7·45	9·75	10·69	12·64	14·75	20·25	10·28	105·45	6·10	,, 5th	222
Ruby Estate ...	4·88	4·16	2·47	0·74	4·12	6·45	10·21	10·18	12·75	16·27	20·48	10·82	103·53	6·00	,, 5th	237
La Dauphine Estate ...	5·28	3·44	2·80	0·54	4·20	6·74	8·44	10·59	12·97	12·24	17·05	7·16	91·45	4·17	,, 5th	275
Union Vale ,, ...	3·95	2·86	2·21	0·45	3·79	5·01	9·31	9·76	12·41	13·20	18·15	6·58	87·68	4·00	,, 5th	185
Beausejour ,, ...	6·37	5·63	4·00	1·20	6·68	8·06	10·88	12·46	14·73	20·41	19·25	9·19	118·86	5·12	,, 5th	294
Choiseul, Morne Lezard Est.	4·57	3·89	2·63	0·85	6·70	6·96	8·76	10·08	13·49	11·19	15·08	6·22	90·42	3·09	Sep. 12th	259
Park Estate ...	4·70	3·89	2·31	1·16	7·52	6·53	9·72	9·48	14·54	18·32	16·29	8·07	102·53	4·12	Oct. 5th	253
Woodlands Estate ...	3·28	2·37	1·68	1·41	7·14	5·81	10·24	11·75	12·17	9·47	30·96	7·92	104·20	3·12	,, 5th	256
Londonderry ,, ...	4.22	4·91	2·94	0·70	7·17	6·46	8·56	8·89	12·54	13·20	14·70	6·46	90·75	2·89	,, 5th	276
Laborie, Giraud ,, ...	4·01	3·64	2·15	0·61	7·15	5·54	10·10	10·73	15·40	19·72	18·32	6·66	104·03	5·56	,, 5th	206
Black Bay ,, ...	1·20	1·57	0·67	0·16	3·84	3·87	5·77	6·46	9·22	6·47	11·12	2·28	52·63	2·08	,, 5th	113
Vieux-Fort, Retraite Est.	2·17	1·55	1·01	0·73	6·20	4·77	6·83	7·15	10·14	11·05	15·29	3·68	70·57	3·60	,, 5th	159
Moule-à-Chique Estate	1·32	0·46	0·38	0·49	2·49	2·48	4·12	2·26	5·27	2·37	9·04	1·56	32·24	1·55	Sep. 12th	115
Beausejour Estate ...	2·01	1·27	0·58	0·59	4·58	3·64	4·85	5·76	9·72	9·24	12·71	2·74	57·69	2·90	Oct. 5th	161
Pointe Sable ,, ...	2·15	1·67	0·94	0·70	3·96	4·07	6·09	6·91	10·13	7·31	11·31	3·84	59·08	3·88	,, 5th	151
Micoud, Troumassée Est.	2·20	2·05	0·32	1·20	1·90	4·87	5·09	5·22	7·08	6·56	20·79	2·53	59·81	3·18	,, 5th	133
Dennery, Mamiku Estate	2·47	1·83	0·85	0·87	3·72	3·27	6·41	6·87	11·75	8·48	14·75	2·83	64·10	2·43	,, 5th	280
Errard Estate ...	3·86	1·63	1·11	1·37	4·71	5·05	8·95	10·80	18·85	14·98	16·97	6·05	94·33	6·50	Sep. 5th	222
Prospect ,, ...	4·11	2·47	1·13	1·22	3·77	5·48	8·00	9·15	19·61	13·61	16·73	5·93	91·21	5·00	,, 5th	237
La Cayé ,, ...	2·04	1·66	1·03	0·72	3·05	4·54	7·98	7·89	11·77	8·70	12·46	5·41	67·25	2·28	,, 6th	134
Ressource ,, ...	2·92	1·33	1·37	1·01	3·47	5·99	6·91	10·90	13·71	11·75	18·55	4·24	82·15	4·70	Oct. 5th	148
Richfond ,, ...	2·99	1·71	1·26	1·10	4·09	4·47	7·10	9·19	13·54	10·23	12·28	4·19	72·15	2·64	,, 5th	177

* Incomplete.

F. A. WALTERS, *Agricultural Superintendent.*

PRICES OF NURSERY PLANTS, ETC.

The prices of plants do not include the cost of the box or baskets, for which a charge will be made if not returned to the Department.

All prices specified are for plants of standard quality. The prices of plants not included in this list will be fixed by the Agricultural Superintendent.

When Nutmegs are supplied by the owner for grafting, a charge of 3d. will be made for each plant on delivery.

An addition of 100% is made on the price for all plants supplied for export from the Colony.

No plants are supplied on Public Holidays.

At least six months previous notice must be given when large quantities of such plants as Coffee, Cacao, Nutmegs, Citrus, Cane plants, etc., are required as it is not feasible to keep large supplies of these on hand. At least six months' notice is required for large supplies of budded citrus, the sour stock for which have to be specially propagated.

Complaints as to the quality or quantity of plants, etc., supplied or as to the prices charged, should be made in writing to the Agricultural Superintendent.

PLANTS.

Oranges Budded	6d. per plant
Oranges Sour	1/- per hundred
Grapefruit Budded	6d. per plant
Lime Plants (seedlings)	1/- per hundred
Lime Plants Budded/Grafted	2d. per plant
Mangoes Budded/Grafted	6d. ,, ,,
Coffee Plants	1/- per hundred
Cacao Budded	2d. per plant
Nutmegs Grafted	6d. per plant
Avocado Pear	2d. ,, ,,
Avocado Grafted	2d. ,, ,,
Cane Plants	1/- per hundred
Pineapple Plants	2d. per plant
Guava	1d. ,, ,,
Eucalyptus	1d. ,, ,,
Casuarinas	1d. ,, ,,
Palms (various)	3d. ,, ,,
Ornamental Plants (various)	2d. to 1/- per plant
Seeds (various)	2d. to 6d. per packet
Seeds Vegetable	2d. to 3d. ,, ,,
Plants for wind-breaks, hedges, etc., other than the above mentioned	1d. to 2d. per plant.

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